Out of sight, out of mind? Educational outcomes of children with parents working abroad.

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Abstract

This paper studies the impact of parental emigration on educational outcomes of children. Based on novel data for lower secondary pupils in Poland, the empirical approach exploits variation in emigration within families over time. Estimates suggest that parental employment abroad has a positive immediate impact on a pupil's grade. Parental education appears pivotal; children of high school graduates benefit most. Longer term effects appear more negative, however, suggesting that a prolonged migration significantly lowers a child's grade. Interestingly, siblings' foreign experiences exert a large, positive impact on pupils' grades.

JEL-Classification: F22, I29, J13
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1 Introduction

The recent enlargements of the European Union resulted in new migration trends. An increasing number of households decide to send a member abroad, leading to family separation. The Polish Ministry of Education reports that 20% of Polish educational institutions surveyed in 2010 had pupils for whom one or both parents emigrated abroad.[1] In this paper I analyse the impact of parental emigration on educational attainment of Polish children whose parents work abroad (henceforth PWA children).

Large scale parental emigration raises questions about the impact family separation may have on children. There are concerns for children's immediate welfare as well as long term socio-economic implications. There is also growing public perception in sending countries that parental emigration has detrimental impact on children.[2] In light of the theoretical literature to date, however, it is ambiguous whether the impacts of parental employment abroad are negative or not.[3]

These considerations are crucial because human capital acquisition early in life depends largely on parental decisions and is vital for short and long-term outcomes of individuals. It also plays an important role in economic development.[4] One's skills are shaped by both nature and nurture. They depend on the initial level of human capital as well as investments made, and these two elements complement each other. For most of childhood, parents decide which investments to make in children. For example, they may spend quality time with children or invest money in their education.

In that sense, also the emigration decision may have a bearing on a child's development. Emigration leads to family separation and less quality time with the migrant parent. Children may also be given greater household responsibilities if a parent emigrates. Moreover, family member emigration may change the perception of returns to education, depending on the demand for labour in the destination countries.[5] At the same time, migration usually results in an increase of household income,[6] which may benefit children.

Since there are forces acting in opposite directions, the question of the relationship between parental migration and children's schooling is an empirical one. Moreover, the theory is silent on potential heterogeneous impacts, depending on the family background and nature of migration. The literature to date has provided mixed results and has not always dealt with the key identification issues. This is mostly due to data limitations; it is

[1] See Tynelski (2010).

[2] For example, in a policy report Tynelski (2010) expresses the worry that children whose parents work abroad feel abandoned and lonely. He emphasises that they may struggle with their identity, definition of priorities and with their educational responsibilities, which may influence school attendance and overall performance.

[3] See Antman (2013) for a comprehensive review of the literature.

[4] See Cunha and Heckman (2007); Barro (2001); Behrman et al. (2006); Feinstein (2003).

[5] See Kandel and Kao (2001); Chand and Clemens (2008).

[6] See Antman (2012).

difficult to obtain data matching educational performance of children and the emigration situation in the family. Therefore, I created and collected a data set for this purpose (See Migration and Education of Children in Poland 2012 (MECP2012) data[7]). In particular, I obtained detailed information about migration experiences in the families and their timing, family background and school progress of pupils measured by grades, rather than drop-out rates. As becomes clear in the analysis, the timing of emigration and precise measures of educational attainment are key for establishing the relationship; so far they have been rarely used in the literature due to lack of such data.

I analyse how the average grade of respondents is impacted by parental employment abroad at a given point in time. The ordinary least squares regression results indicate a negative, significant in size, relationship between parental emigration and a pupil's grade. They reflect the fact that PWA children perform on average worse at school, irrespective of the emigration decision of their parents.

However, migration decisions may be endogenous. There may be unobserved characteristics of migrant-sending families which simultaneously influence the decision to emigrate and the child's school performance. They may confound the estimates of the true effect. To resolve the problem, I employ individual fixed effects approach which accounts for any time-invariant unobserved differences between respondents. Therefore, the parameter of interest is identified on variation in migration status within families over time.

I find a positive and statistically significant immediate impact of parental emigration on the educational attainment of children. It suggests that, when a parent is abroad, the grade of a child increases by up to 5% of a standard deviation. One potential explanation for such a result is that the gain from the increased household income following migration is as large as or greater than any potential negative effects of family separation.[8]

Parental education appears pivotal. PWA children of high school graduates gain most, relative to their non-PWA peers whose parents have equivalent educational attainment. Moreover, PWA children whose parents have lower than secondary education (67% of the overall group) do not perform better, on average, than their peers from a similar background. I suggest that more educated parents are more likely to succeed abroad by securing better employment and assimilating to a greater extent. As a result, they may have higher incomes and life satisfaction. This, in turn, is likely to influence the family life and may be reflected in a child's school performance. Moreover, a child's education may be of greater importance to more educated parents. Then they may allocate a higher share of the household income to children's schooling and be more personally involved in

[7]Comprehensive information about the data set can be found at: https://sites.google.com/site/joannacliftonsprigg/data. However, I include necessary information about the data in the online Appendix to this paper which can be found at: https://sites.google.com/site/joannacliftonsprigg/research

[8]Note that the separation effect is likely to be lower than in previously studied cases because of the nature of migration in question.

their child's education.

I allow for a delayed response to emigration by including lags of the parental migration status in the regression. I find that the grade is negatively affected after 2 semesters from parental departure. Since emigration in the sample is temporary in nature, I consider various migration patterns. If the emigration episode is short-lived, the size of the impact is not striking. A departure for 2 or more semesters, however, has the potential of significantly lowering a child's grades. It is possible that family separation becomes more burdensome and the income flow falls the longer a parent is abroad. The negative impact gradually disappears following a parent's return.

I extend the analysis to sibling emigration and find large, positive, significant and persistent effects on the attainment of pupils. This is only true for those siblings, whose first migratory experience occurred within the observed 3-year-period. The same cannot be said about siblings who have migrated recently but have also been living abroad prior to September 2009, when the survey began. The positive association may be related to income effects as well as a change in perceived returns to education. Siblings with longer migratory experiences are likely to be older and have their own families. Hence, they may remit less and exert lesser influence on younger relatives.

The analysis is not without limitations. The empirical approach does not cater for situations in which time-varying changes, affecting both the school outcomes of pupils and the migration decisions of parents, take place. I discuss such potential limitations.

My findings may be limited in scope as I cannot provide detailed insight into the mechanisms behind the effects I find. Nonetheless, this paper contributes to empirical migration research in several ways. The results of empirical studies to date are mixed and often difficult to reconcile. This paper highlights the importance of using adequately defined variables to accurately measure the effects of parental emigration.

Firstly, the source countries which emerged as a result of the EU enlargements bear little resemblance to the traditional emigration states like Mexico or Philippines.[9] The main differences lie in economic performance, culture, tradition and their history. The focus on a new EU member state provides an opportunity to reevaluate claims in the literature and to investigate whether the divergence between source countries leads to differential outcomes.

Although some analyses for Eastern European countries are available, they often focus on other indicators of children's well-being and are less flexible in terms of the analysed migration patterns.[10] The evidence is mixed and scarce, partly due to the lack of data,

[9] McKenzie and Rapoport (2011); Antman (2011a); Cortes (forthcoming)

[10] For example, Botezat and Pfeiffer (2014), using instrumental variables and data for Romania, provide evidence that parental emigration has a positive impact on school grades of children but has negative implications for their health and emotional well-being. They focus, however, solely on cases when the parent was absent for at least 12 consecutive months. Gassmann et al. (2013) find that migration from Moldova was not associated with negative outcomes on children's well-being. Finally, Giannelli and Mangiavacchi (2010) argue that, in Albania, father's emigration increases probability of dropping out of

different research methods and heterogeneity among the countries.

The migratory movements captured in the sample differ largely from those studied before; they are usually temporary, legal, circular and characterised by one family member working abroad, whilst others stay in the home country. For that reason PWA children are less burdened by parental departure and may still gain from the increased income.

Parental emigration in middle-income countries is unlikely to lead to school drop-outs,[11] which is how educational attainment is usually captured in empirical studies.[12] Rather, it impacts school grades, school attendance and children's behaviour. Therefore, analysis of the impact on grades may be more informative about the exact mechanisms behind changes in children's performance.

Most importantly, the analysis reveals the complexity of the effect migration can have on children. The impacts I find depend on the socio-economic background of the family, as well as on the timing and duration of migratory movements. In particular the analysis of timing of migration provides new insights into the changes which occur as a result of parental migration. The choice of family member to emigrate is also crucial; parental emigration may not benefit children, but foreign experiences of siblings may be favourable.

Section 2 describes the data. Section 3 outlines the methodology employed and related concerns one may have. Results are presented in Section 4 and an extension to sibling emigration in Section 5. Section 6 concludes.

2 Data and descriptive statistics

I have designed and collected a survey among a group of 2822 teenagers in the final year of the lower secondary school in Opolskie region of Poland. Detailed discussion of the Migration and Education of Children in Poland 2012 data (MECP2012) can be found online.[13]

Poland is the largest of the EU member states which joined the organisation since 2004. It has also become the largest (in absolute terms) sending area. It is estimated that over 1.2 million Poles (3.1% of the population) left the country for temporary employment abroad between 2002 and 2011 Census. Temporary emigration has resulted in a phenomenon of leaving families behind by many Poles. 9.6% of all Polish households had at least one temporary emigrant at the time of the 2011 Census, up from 3.8% in the 2002 Census (The Central Statistical Office of Poland, 2013a). Thus, Poland serves as a good case study for analysis of consequences of family separation due to migration.

school or delaying school progression.

[11] This certainly is a more likely scenario in Poland, where 95.1% of 16-18 year-olds have been reported as attending educational institutions in 2011 (The Central Statistical Office of Poland, 2012).

[12] See Antman (2012); Kuhn (2006).

[13] See https://sites.google.com/site/joannacliftonsprigg/data

2.1 Education system in Poland

The education system in Poland is divided into three compulsory stages: primary (children aged 7-12), lower secondary (age 13-15) and upper secondary (age 16-18/19). During the first two stages pupils follow a common national curriculum and write a competence test at the end of each stage. Tracking begins at the age of 16 when pupils apply to institutions with different educational goals. One is obliged by law to remain in full-time education until the age of 18.

The data used in this paper refer to pupils aged 16, in their final year of the lower secondary school, and record retrospectively their performance over a 3-year-period. Hence, one can follow each pupil throughout the 6 semesters he spent at the school.[14]

2.2 Study area - Opolskie, Poland

Opolskie region is the smallest of 16 Polish provinces and is located in southern Poland, along the border with Czech Republic, as well as in close proximity to Germany, with a population reaching just over 1 million inhabitants. According to the National Statistical Office of Poland, the registered unemployment rate in the area in 2012 was 14.4% (compared with 13.4% for Poland as a whole) and the region contributed 2.1% to the Polish GDP with a GDP per capita in Opolskie equal to 80.1% of the Polish GDP per capita (The Central Statistical Office of Poland, 2013b).

Opolskie has been historically the highest out-migration region of Poland. The reasons behind the significant outflow of population from Opolskie are numerous and include amongst others historical, ethnic, cultural, political and economic motives.

With 107 985 residents of Opolskie residing *temporarily abroad for at least 3 consecutive months*, the region had the highest proportion of temporary emigrants per 1000 inhabitants in the entire country in 2011. Of them 94.5% emigrated to other EU countries, almost 62% to Germany. Resultantly, 17.8% of all households in the region had *at least one emigrant* at the time of the 2011 Census.

73% of temporary migrants have left Poland to work abroad. Of those, almost a third were seeking better wages and 31% could not find employment in Poland prior to departure (The Central Statistical Office of Poland, 2013a). Jończy and Rokita-Poskart (2013) estimate that in 2010 12% of the total population of Opolskie were working abroad

[14]This particular age group was chosen as the comparisons of performance are still reliable at this stage of education, thanks to the common national curriculum. The choice also allowed for a collection of the biggest amount of information on educational attainment of pupils.

Moreover, the middle stage of education might be the most crucial in terms of the impact of migration in the family on educational performance. The lower secondary pupils have been pointed out by the recent Polish policy-makers' report as the most affected by the migratory outflows from the country (Tynelski, 2010). At this age, teenagers still rely on their parents, particularly when making career choices. Therefore, the consequences of family separation may be most visible in this age group. At the same time they are independent and sufficiently informed to successfully participate in the study. Thus, they seemed a suitable study population.

and on average spent 3.9 months of the year away. They earned approximately PLN 5.9 billion abroad and remitted PLN 4.2 billion. The remitted funds amounted to 1.2% of Opolskie's GDP in 2010.

Focus on the area increased the likelihood of the migrant group in the sample being sufficiently large to obtain statistically significant results in regressions.

2.3 How the data was collected

There are 140 lower secondary schools for pupils aged 13-16 in Opolskie.[15] At the time of the study they educated approximately 9 500 16-year-olds. Due to financial and time constraints of the project, 114 largest schools were contacted with a request to participate in the study; of those 52 participated.[16]

Data was collected, shortly before the end of school year, in June 2012 via a short questionnaire in Polish to students and school management.[17] Additionally schools provided a time series of data on school performance of the respondents; some also released data on respondents' performance in the national tests in Polish language, maths, history, sciences and foreign languages.[18]

Students have been asked about their age, gender, nationality, as well as family situation, i.e. number of siblings, birth order, age of siblings, who they live with, parents' age, education level and employment status. They have also been asked about participation in any extra-curricular activities, plans to attend university and emigrate. Lastly, they have been asked whether any member of their close family (mother, father or sibling) has emigrated. Children from emigrant families were then asked additional questions about the destination country, period of absence of the parent, frequency of contact with the emigrant parent and whether they have experienced an increase in household responsibilities due to emigration. The respondents have not been asked about the household income as they might have been unaware of the exact financial situation in their families and because it would have caused a controversy, potentially leading to less schools participating in the project. Thus the only indication of the family social status can be drawn from the information about parental employment and education level.

Schools also shared their impressions of the migration problem within families and its impact on pupils. The management of schools indicating existence of large migration

[15] After exclusion of schools for adults and for children with disabilities.

[16] 62 schools declined participation, mostly indicating timing of the project (close to the end of the school year) as well as the sensitivity of the issue to be investigated as a reason for their refusal to cooperate.

[17] For the English translation of the pupils' questionnaire see Appendix, Part A.

[18] School management have been informed of the aim of the data collection when agreeing to participate and setting a suitable date for the survey to be conducted. Respondents themselves, however, were unaware of the project until the day of the survey and have been asked to answer the questions on the spot, which lowered the likelihood of them opting out of the process by not coming to school on the day of the survey. Research aims were explained to the respondents on the day to ensure informed consent and allow them to opt out.

in their community, have declared observable problems with behaviour, motivation and school attendance of pupils whose parents emigrated.

The questionnaire responses were matched with the information provided by the school regarding respondents' performance.

2.4 Data Description and Initial Descriptive Analysis

There are 2822 respondents in the data, observed over a period of 6 semesters between September 2009 and June 2012.[19] All of them provided information about migration experience within their family but only 2669 gave a detailed account of its timing over the 3 year period and were included in the analysis.[20]

2.4.1 Variable definitions

I define **a PWA child** as a child who has had at least one parent abroad in a given semester[21] and stayed in the home country during parental emigration experience. Given such definition, one may have one or both parents abroad at the same time; moreover, a migrant parent may be absent in one semester and return to Poland in another and this change will be reflected in a change in the PWA child status.

The main dependent variable is **the grade of a pupil**. The grade is taken as an average over all courses taken in a given semester and is measured at the end of each semester. It ranges from 1 to 6, with 6 being a top mark awarded to a pupil for extracurricular achievement in the subject area. Pupils who mastered 100% of the curriculum in a given semester are usually awarded 5; 1 is a fail mark. The grade is awarded internally but based on the requirements of the national curriculum for a given year. The average grade in the sample has a mean of 3.61 and a standard deviation of .851.

Before progressing to the upper secondary school, pupils write **the national exams** in the following areas: Polish language and literature, history, maths, science and foreign languages. They are organised nation-wide by one Exam Board and blind-graded in percentage terms. I possess information about the exam results for under 13% of the sample, which is insufficient to use for the analysis but can be used for some checks.

2.4.2 How common is migration?

The migration status can be identified from two variables in the questionnaire: about family having experienced migration in the 3-year-period and the exact timing of migra-

[19]This is true only in cases where complete information was provided in the survey and the school released a full history of academic performance. In some cases less that 6 semesters of data are available.

[20]Regressions using the complete set of observations do not lead to different conclusions. However, using information about emigration which does not vary over time does not allow for panel data analysis, which is the preferred approach here.

[21]This implies that the parent left or was already abroad at the beginning of the given semester.

tion. Based on having a migrant parent at any time during the observed period PWA children constitute almost 18% of the sample (see Table 1). The number of PWA children in the sample at given time t is lower than the overall measure.

Table 1: Emigration situation in the sample

Panel A: Pupils from migrant households (irrespective of the exact timing)			
	Absolute value	Percent	Percent
total sample (n)	2669	100	
migrants (incl. sibling)	685	25.67	
migrant parents - total	479	17.95	100
Who emigrated:			
only father	315	11.80	65.76
only mother	100	3.75	20.88
mother and father emigrated	64	2.40	13.36
Panel B: Average duration of parental emigration (time spent abroad during the observed 6-semester-period)			
father's emigration			4.40 semesters
mother's emigration			1.29 semesters

Source: MECP2012

The migratory movement is father dominated and in only 64 cases a respondent indicated having both parents abroad. Moreover, only 40 respondents stated that both their parents were away at the same time. The main receiving country in the sample is Germany,[22] followed by the Netherlands and the UK, which points to the fact that emigration occurs over relatively short distances with the possibility of frequent returns.

Not only do families tend to send one member at a time for emigration, but also common patterns of the movement emerge within the sample. Parental migratory movements can be grouped into four main patterns. There are parents who have been absent for at least 6 semesters, those who returned from or left for emigration during the period for which I have data. Lastly, there is a significant group of migrants who experience short, repetitive spells of emigration (See Appendix, Section A.1).

Overall, migration observed in the sample is characterised by rather short-term, circular movements, with respondents having frequent contact with the migrant parent. These features distinguish the new European migration spells from those most commonly analysed in research of cross-border families[23] and I expect them to have a bearing on the findings in my research.

[22] Almost 65% of migrant mothers and 64% of migrant fathers left for Germany; see Appendix, Section A.1.

[23] Studies of migration from traditional sending countries like Mexico or the Philippines highlight the fact that children are often left with distant family members for prolonged periods of time with little contact with the migrant parents (See McKenzie and Rapoport (2011)). This is not the case in my data.

2.4.3 Who are the emigrant families and their children?

Migrant and non-migrant families differ in terms of socio-demographic characteristics. Children from migrant families have on average more siblings and tend to be the younger ones in the family (birth order of 2.3 versus 1.8).

A lower percentage of mothers in emigrant families work compared to those in non-migrant families. Migrants from households in Opolskie are low-skilled with 44% of mothers and 63% of fathers having finished vocational schooling, and 36% of mothers and 29% of fathers high school. The patterns observed in the data as well as characteristics of the PWA families are in line with the 2011 Census output and the literature on Polish emigration (The Central Statistical Office of Poland, 2013a; Kaczmarczyk and Okólski, 2008). This suggests that the data should rather accurately reflect the reality and lessens any concerns about potential reporting errors respondents could have made. Measurement errors would be problematic if many and non-random.

Performance of children also differs across the two groups. Children from migrant families obtain on average 0.16 lower average grade than children from non-migrant families (see Table 2).

Table 2: Characteristics of children and households in the sample

	Migrant (n=809)		Non-migrant (n=1981)	
	mean	st.dev.	mean	st.dev.
number of siblings	1.74	1.17	1.62	1.12
mother's age	40.40	5.29	41.36	5.57
father's age	43.19	5.81	43.90	5.74
child's average grade	3.49	0.83	3.65	0.85
Mother's education	N	% of group	N	% of group
primary	16	5.71	229	10.02
vocational	122	43.57	793	34.70
secondary	101	36.07	769	33.65
tertiary	41	14.64	494	21.62
Mother works	189	69.23	1,542	72.36
Father's education	N	% of group	N	% of group
primary	11	4.10	213	9.70
vocational	168	62.69	1031	46.27
secondary	78	29.10	644	29.31
tertiary	11	4.10	309	14.06
Father works	241	91.98	1855	90.53
% respondents female	57.82		50.90	

Source: MECP2012

Note that the descriptive statistics of the PWA families suggest that there may be a degree of negative selection into migration. For this reason I will later argue that selection into migration cannot drive the effect I find.

2.5 Representativeness of the sample

The population of interest are children in lower secondary education with parents temporarily working abroad. Given the choices made during the data collection process, there are questions about the internal and external validity of any analysis utilising the data.

Firstly, despite the fact that the initial descriptive statistics from the collected data match what we already know about migrant families in Opolskie, one may be concerned that the collected data is not representative of the studied population. Schools and participants can opt out of the study, which may compromise the representativeness of the sample if the non-participation is not random.

Another worry is that Opolskie may not be representative of the situation in Europe, as it has been experiencing high levels of population outflow, both historically and in recent years. The scale and persistence of the phenomenon may have led to a different response of families to temporary migration. For example, there may be policies in place to support migrant-sending families. Moreover, if having a parent working abroad is perceived as a norm, children may differently react to it than if migration was a new phenomenon. Thus, the situation in Opolskie may differ from that in the rest of Poland and other European migrant-sending countries.

In Table 3 I present a brief summary of arguments for why school and participation selection can be thought of as almost random and that at least partial generalisation beyond Poland may be possible. See Appendix, Section A.2 for further discussion.

Table 3: A summary of arguments for representativeness of the sample

	School selection into the study
1	Not all schools participated in the study. This can be problematic if opting out not random.
2	No signs of non-random selection with respect to the local geography: • Participating schools equally spread across the region • Most populous and high migration areas well captured
3	Other factors, not related to migration situation in the school, influenced schools' decisions to participate.
4	No indication that participating schools were not affected or differently affected by migration than others • Positive impacts could be driven by the fact that only schools in which children cope well with parental migration participated. • Schools indicated, however, that when occurring parental migration has negative impact on children.
5	No indication that schools in less covered areas opted out in a non-random way. • Areas less covered by the study do not differ in socio-economic characteristics from the rest of the region. • Average school performance of pupils from less covered areas does not differ from that of other pupils.
6	The participant and non-participant schools do not differ systematically in terms of pupils' performance. • I compare the average outcomes of pupils of all schools in the region in the final exam in 2012. • Pupils in non-participant schools performed worse than pupils in participating schools; the difference is small and statistically insignificant.
	Pupils' participation decision
1	Majority, but not all pupils, participated. This can be problematic if opting out not random.
2	Not an issue on a large scale. High response rate - 2822 out of 3423 enrolled pupils participated.
3	Reasons for non-participation: • 540 pupils absent on the day • 41 refused to participate
4	The non-respondents had on average lower grades and missed more school. • Impossible to establish if this is related to parental migration but it is unlikely
	Scale of the phenomenon in other regions
1	The extent of the analysis is limited due to scarcity of data.
2	The estimates of the scale of the phenomenon vary, depending on the source.
3	Opolskie is the highest migration region in Poland. However, the estimates of number of PWA children in other regions of Poland are comparable. Characteristics of PWA parents in other regions match those in the sample.
4	The phenomenon reached a significant scale among other new EU member states and Eastern European countries. The states are comparable on many dimensions.

3 Empirical framework

I investigate the relationship between one's individual school performance and the experience of emigration within one's family. The preferred specification is the following:

$$AverageGrade_{it} = \alpha + \beta EmigrParent_{it} + \gamma_i + \theta_t + \epsilon_{it} \quad (1)$$

where $AverageGrade_{it}$ is the average grade of individual i in semester t, $EmigrParent_{it}$ is a dummy variable equal to 1 if an individual i has at least one parent abroad at time t and zero otherwise, γ_i is an individual fixed effect, θ_t are semester fixed effects and ϵ_{it} is the error term. Unless otherwise specified, the standard errors in the regression are clustered at an individual level, as I expect the individual outcomes to be correlated over time.[24] The parameter of interest, β, is identified on variation in parental migration within families over time.

Estimation concerns

Time- or group-invariant characteristics

I include the individual fixed effects into the regression to control for any unobserved individual level characteristics *which do not vary over time*. This will isolate any confounding effect these factors may have on the parameter of interest, if they are correlated with the emigration status in the family and the school performance of children.

Many characteristics which influence children's performance at school are also correlated with migration decisions of parents. Parental education or socio-economic characteristics of the household are an example; from the summary statistics it is clear that low-skilled parents engage in temporary employment abroad more often than parents with higher qualifications. At the same time, one may argue that children's school performance is likely to be correlated with educational attainment of their parents. Hence, children of low-skilled parents are likely to perform worse at school and to have a parent abroad.

The fixed effects approach will also eliminate the risk of reverse causality in β. Arguably, the educational attainment of children may cause the migration event, rather than the other way round. This is, however, unlikely in the Polish situation. Based on the results of the survey, the general perception in respondent schools is that parents often do not appreciate the potential impacts emigration may have on their children and that their decision is primarily driven by income considerations. I check for reverse causality by including leads of the emigration variable into regression and find no evidence of the problem (See Appendix, Section B). Nonetheless, exploring the panel dimension of the data and allowing for identification to be made upon a change in the emigration status, resolves the potential issue.

[24]The definition of the main explanatory variable, $EmigrParent_{it}$, is to an extent dictated by the data constraints. One may argue that it would be optimal to use two emigration dummies, allowing for differentiation between having one or two parents abroad at time t. However, since only 40 respondents had two parents abroad at the same time during the observed period, separating those with one or two parents abroad leads to imprecise estimates in the regression, not providing any further insights into the analysis.

Equally, one could separate the emigration variable to account for the role of gender of the emigrant parent in the overall impact on the child's performance (See Cortes (forthcoming)). Also in this case the coefficients on maternal emigration become statistically insignificant, since not many mothers in the sample engage in employment abroad. Given the data at hand, there is a trade off between exploring the relationship in more detail and the estimation precision.

The material studied at school changes and becomes more difficult with time. Since the pupils' performance is tracked over a 3 year period, some change in pupils' grades may be attributable to the advancement in their studies and not to other circumstances.[25] The semester fixed effects will isolate changes in grades over time which are common to all pupils.

Is the average grade a good measure of performance?
The assessment of pupils against the national curriculum is at the teachers' discretion as the grades are awarded internally. Hence, pupils may be awarded different grades for comparable performance by different teachers. They may also be scored relative to their classmates. However, I expect that teachers are consistent in the way they assess pupils over time; for example, a lenient teacher will remain lenient over the period of 3 years. If this is the case, the differences in average grades due to teachers' subjective assessment will be teacher-specific and time-invariant, and therefore captured by individual fixed effects.

One can still argue that some teachers may not be consistent over time in their assessment. One such case may be when inexperienced teachers learn over time and adjust their assessment of pupils accordingly. It is difficult to predict whether such a behaviour would result in an improvement or deterioration of pupils' grades over time.

This would be problematic if the changes in grades driven by the teacher's learning process coincided with parental migration and occurred on a significant scale. I find the scenario unlikely for the following reason: if teachers were adjusting grades as they learn, the changes should be gradual and occurring in the same direction (i.e. improvement or worsening of grades) until they reach a point at which the assessment of pupils is deemed adequate. On the other hand, migratory movements in the data are circular, short term and vary in timing. It is therefore unlikely that the two patterns consistently coincide to explain the results presented in this chapter.

Alternatively, teachers may become lenient towards a PWA child or provide more support for the child upon learning that his parent has emigrated. Then the improvement in the pupil's grades may indeed coincide with parental departure. It is difficult to rule out such a scenario here.[26]

[25] There is, in fact, a clear pattern to the average grade over time in the sample (see Appendix, Section B). Each year there is a systematic improvement in pupils' grades in the second semester, when compared with the first semester of that year. Further, the gap in grades between first and second semester in each year widens further into the lower secondary school.

[26] Nonetheless, to check whether the average grade is a satisfactory measure of school performance I rerun the regressions using the available exam scores for the 13% subsample of pupils as a dependent variable; the results, although statistically insignificant, imply a similar relationship between parental migration and performance. See Appendix, Section B.5.

Other time-varying changes

The approach does not cater for a scenario in which the unobserved characteristics, crucial for one's school performance, are time-varying and correlated with the explanatory variables explicitly included in the regressions. I already provided some examples. Here I consider further cases.

One may argue that a change in circumstances may trigger a decision to emigrate or return from emigration and, at the same time, influence school performance of children. In particular, an economic shock to the region may influence both migration or return decisions and investments made in children, and therefore grades. It could trigger a change in the availability and composition of teachers in the region, which may have a direct impact on grades. However, there is no indication that the region was either severely or positively economically affected in the observed period of 2009-2012. Moreover, changes in economic conditions of destination countries did not discourage emigration from Opolskie in this period.footnoteIn Section B.1 of the online Appendix I provide some statistics on the local economy in the observed period.

To check for potential reverse causality, I run regressions including leads of the emigration variable. The results suggest that the future emigration situation in the family does not predict current school performance (See Appendix, Section B.2).

Endogeneity of emigration

Another estimation threat comes from the fact that households select into migration on basis of some often unobserved characteristics. Then they also decide who to send, how long to emigrate for and whether to return. These types of selection may invalidate the estimation results (despite the use of individual fixed effects) if they depend on unobserved time-varying characteristics of respondent families which are also key for school performance of children.

Firstly, as mentioned before, the decision to emigrate is most likely correlated with socio-economic characteristics of the households which are also correlated with educational outcomes of children. However, if time-invariant, they will be captured by the individual fixed effects. Otherwise, selection in this case would introduce a negative bias into estimates.[27]

Entire families may decide to emigrate as opposed to sending a member abroad. Arguably, then the analysis would be comparing only a subsample of migrants with non-migrants, introducing bias if the two groups differ substantially from each other. However, I do not find strong evidence in the data to suggest that many families leave for life abroad.

The decisions whether to return and how long to emigrate for can be (at least partially) captured thanks to the information about the timing of migration contained in the

[27]This is because families with a lower socio-economic background (which is associated with worse school performance) are more likely to engage in migration.

data. I elaborate further on these concerns in Section B.3 of the online Appendix.

PWA children dropping out of school and non-respondents

One further complication I cannot control for is posed by the fact that some pupils have dropped out of the class at some point over the observed period and before the survey took place. Others, on the other hand, have not responded to the survey. As a result they were not included in the sample.

If those who have a parent abroad were more likely to drop out, then the fact that they are omitted from the sample may introduce bias into the estimation.

If many PWA students do not progress to the next level at school and it is due to their parents' emigration, my analysis may underestimate potential negative impacts of emigration by not considering class failure in the regression and focusing on grades, conditional on having progressed to the final year of school. I find, however, no evidence of overrepresentation of PWA pupils among those who repeat a year in the data (see Appendix, Section B.4).

A similar problem arises if the non-response to the survey is not random. In particular, one may be concerned that due to the sensitive nature of the survey PWA pupils were more likely to refuse participation in the study. If so, they may be overrepresented in the group of non-respondents. Non-respondents performed worse on average relative to the respondents. If the worse performance of this group is due to the increased presence of PWA children and was driven by parental migration rather than other factors, then the results I present may be upward biased as they do not account for the outcomes of this group. I cannot, however, establish how many non-respondents are PWA children and if parental migration is the driver of the lower grades among the them. Given that migrant parents are negatively selected, any worse performance of potential PWA non-respondents could be due to selection as well as other factors.

Alternative specifications

The biggest concern with the approach I take is that some of the omitted variables key for the analysed relationship may vary over time. For example, the average grade is likely to be driven by its historic values as students' performance is correlated over time. The past performance variable may be capturing some environmental and individual characteristics crucial for the future outcomes of pupils as well as migration decision of parents. Therefore, a specification including lagged school performance provides an alternative to my estimation approach. It is particularly useful when considering threats to validity of estimation results because the lagged dependent variable and the fixed effects models have a bracketing property which may be informative of the true relationship being analysed (Angrist and Pischke, 2009).

The results of the alternative approach can be found in Section B.6 of the Appendix. The regressions using this method produce similar results to those I am about to present. The coefficients of interest are, however, smaller and mostly statistically insignificant. This is likely due to the sample size issues when the lagged dependent variable is included.

For illustration purposes, apart from the preferred specification, I also show results of regressions without individual fixed effects and with some individual level controls, such as parental education level, employment and number of siblings, in the results table. I also include school or class fixed effects to control for the role the learning environment may play in performance, and the semester dummies, for reasons explained before.

4 Influence of parental emigration

4.1 Immediate impacts

Table 4 contains the regression results for the relationship described by Equation 1. The OLS regressions without individual fixed effects (columns (1)-(3)) produce negative, statistically significant coefficients on emigration, varying between -.119 and -.091. The results suggest that having a parent abroad can lower pupil's current average grade by up to 14% of a standard deviation, which reflects the findings in the summary statistics of worse average performance of children with parents working abroad.

However, these estimates may be biased due to unobserved time-invariant differences between individuals, which impact the average grade and are correlated with the family's migration decision. In particular, the PWA children are expected to perform worse on average, irrespective of the emigration decision of their parents, given the socio-economic characteristics of the families they come from.

The individual fixed effects regression estimates in columns (4)-(5) of Table 4 imply a small, positive impact, however; parental absence in semester t increases the average grade by .024-.045, which is equivalent with 2.8-5% of its standard deviation. The coefficient is statistically insignificant when semester dummies are included in the regression, though. This may be due to clustering of emigration over time and a degree of confounding of time and migration effects.[28]

[28]Inclusion of time dummies or diff-in-diff approaches may not be the best methods to analyse the data at hand as they do not allow great flexibility. The observed migration behaviour in the surveyed group is very general and not subject to strict restrictions. Emigration can occur at any point in the observed period and I allow for returns, departures, as well as circular migratory patterns. There are also no restrictions on duration.
Looking at the summary statistics, I conclude the following: (i) one should consider years of education separately but allow for correlation across semesters, as semester 2 grade in a given year takes into account pupil's performance in previous semester, (ii) there is a systematic improvement in semester 2 grades in every year and mixed performance across years for all students, (iii) looking at differences between semesters within each year, in Year 1 I observe a greater improvement in grades of PWA children

Table 4: Contemporaneous impacts of parental emigration on children's outcomes

Dependent variable	Average grade				
	(1)	(2)	(3)	(4)	(5)
$EmigrParent_{it}$	-.119***	-.107***	-.091*	.045*	.024
	(.026)	(.026)	(.053)	(.024)	(.037)
Individual level controls	no	yes	yes	no	no
Semester fixed effects	no	no	yes	no	yes
Individual fixed effects	no	no	no	yes	yes
No of observations	13860	10859	10859	13860	13860
No of students	2669	2071	2071	2669	2669

Source: MECP2012
Individual level controls include gender, number of siblings, parents' age, employment and education level, whether parents divorced or one parent died, and school dummies.
Standard errors clustered at individual level in parentheses.
Statistical significance: *** 1 % ** 5% * 10%

The positive or almost no influence of parental emigration on the average grade may be surprising, especially given the general perception that emigration imposes a burden on young people. Nonetheless, such an outcome is plausible as the impact depends on the interplay between the the two mechanisms at play: the positive effect of income gains and the negative effect of separation. It may hinge on the context of migration and the target population studied.

The positive impact implies that the income effect may dominate the negative aspects of family separation. Polish migrants' employment abroad can potentially lead to a three- to fourfold increase in earnings, depending on the employment abroad. There is evidence suggesting that an overwhelming proportion of it is remitted to Poland (Jończy and Rokita-Poskart, 2013).

Moreover, the negative effect of family separation may be mitigated by the nature of Polish migration, where parents (usually fathers) emigrate over short distances and short time periods, often return and have frequent contact with the family.

At the same time many mothers in migrant-sending households stay at home, caring for children. If only one parent emigrates and the other stays at home with the family, children may not be faced with any additional responsibilities as a result of migration. In fact, only 27% of PWA children indicated that their responsibilities increased as a result of parental departure.

but worsening of behaviour and school attendance relative to non-PWA children, (iv) in Years 2 and 3 the improvement in grades is smaller for PWA children. Hence, it seems that the impact depends to a large extent on when the parent was abroad and for how long.
Plotting the mean of migration at time t over time, I observe signs of clustering in migration. A lot of identification comes from the beginning of the observed period; there is a high ratio of returns in the first observed semester and a visible increase in departures from semester 4 onwards. Hence it is impossible to separate time effects fully.

Further, one may argue that, if emigration is driven by the lack of employment in the home country, the family separation may not have such detrimental impacts, depending on the situation prior to a parent's departure. For instance, imagine a family where both or one parent is unemployed prior to emigration and the unemployment not only negatively affects the family finances, but also introduces tension into the household. Then one parent's employment abroad may be a better alternative, even if it leads to separation.

4.2 Parental education level matters

Even though the migration captured in this study is predominantly low-skilled, migrant parents constitute a mixed group in terms of their educational attainment; among fathers 61% have vocational qualifications (below A-level equivalent), 31% completed secondary education and the remaining 8% either have tertiary or lower secondary education.

Parental education level, as well as the family socio-economic situation in general, are crucial for a child's educational attainment as human and cultural capital are transmitted across generations (Black and Devereux, 2011).[29] Migration experience of parents may impact children differently, depending on parental education level. This may be due to different earning potential, but also investments (time and financial) made in their children.

Given these considerations, I interact parental educational attainment dummies with the emigration status in the family to see whether differential effects emerge. I choose father's education as the indicator of parental education as fathers have a higher propensity to emigrate. Since parental education levels in the sample are highly correlated, I do not expect this decision to be crucial for the results. I also combine together the parents with elementary and vocational education into one category.
The main regression equation now becomes:

$$\begin{aligned}\text{average grade}_{it} = \alpha + \beta \text{EmigrParent}_{it} + \lambda_1 \text{EmigrParent}_{it} \times FatherLow_i + \lambda_2 \text{EmigrParent}_{it} \\ \times FatherSecon_i + \lambda_3 \text{EmigrParent}_{it} \times FatherTert_i + \gamma_i + \theta_t + \epsilon_{it}\end{aligned} \tag{2}$$

where $FatherLow_i$, $FatherSecon_i$ and $FatherTert_i$ are dummy variables equal to one if a father's highest educational attainment is below A-level, A-level equivalent or degree education, respectively. As before, EmigrParent_{it} is the emigration dummy variable, γ_i are individual fixed effects and θ_t are semester fixed effects.

The results are presented in Table 5. In the first 2 columns I present results of various regressions without individual fixed effects; I include individual level controls, semester

[29] The usual expectation is that the children's school performance improves with parental education. It is also the case here; regression analysis of the relationship between the child's school grade and parental education level shows that the higher the education level of parents, the better the child's school performance.

fixed effects and class or school fixed effects. The results of the preferred specification outlined in Equation 2 can be found in column (4).

Table 5: Differential impact of parental emigration depending on educational attainment

Dependent variable	average grade			
	(1)	(2)	(3)	(4)
$EmigrParent_{it}$	-.921***	-.762****	-.061	-.081
	(.200)	(0.201)	(0.052)	(0.062)
father's education secondary	0.090**	0.090**		
	(0.039)	(0.039)		
father's education tertiary	0.209***	0.209***		
	(0.053)	(0.053)		
$EmigrParent_{it}$ * low	.882***	.721***	.078	.093
	(0.180)	(0.181)	(0.058)	(0.066)
$EmigrParent_{it}$ * secondary	.780***	.618***	.188***	.189***
	(0.180)	(0.181)	(0.064)	(0.070)
$EmigrParent_{it}$ * tertiary	.125	-.045	.125	.084
	(0.331)	(0.330)	(0.095)	(0.105)
Individual controls	yes	yes	no	no
Fixed effects	class	class and semester	individual	individual and semester
N	10416	10416	12720	12720
no of respondents	1985	1985	2436	2436

Source: MECP2012

Note: Individual controls in all specifications include gender, number of siblings, both parents' education, age and employment.

Two educational groups (vocational and elementary) were combined into a low education category.

All regression specifications produce similar output with a negative coefficient on the emigration experience, positive on education dummies and a positive interaction term between the two variables.

Using the outcomes from column (4), I conclude that, compared to non-PWA children whose parents have an equivalent education level, the average grade of PWA pupils whose parents have lower than secondary education is .008 higher on average. This is an impact equivalent with only 0.24% of the grade's standard deviation and it is statistically insignificant. The finding is important as these students dominate the overall group of pupils with parents working abroad. Other PWA children gain relative to their non-migrant peers whose parents have the same qualifications. In particular, PWA pupils whose parents have secondary education have on average .108 better grade than their non-PWA peers whose fathers have an equivalent education level.

The differential impact of parental emigration, depending on parents' educational attainment, may be related to potentially different success in employment abroad and distinctive perception of importance of education for children's future well-being.

Firstly, the positive income effect of emigration may differ, depending on the education level of migrant parents. Better educated migrant parents may be employed in better paying jobs relative to parents with a lower educational attainment, if jobs require specific

qualifications or knowledge of the language of the destination country. Eurostat data regarding mean earnings in various EU countries and findings of Jończy and Rokita-Poskart (2013) on remittances to Opolskie suggest that, irrespective of the education level, by seeking employment abroad, Poles have a chance to increase their income three- to fourfold. Moreover, the higher their education level, the greater the gain to be made (in absolute terms).

However, many temporary migrants are likely to be underemployed (Barrett and McCarthy, 2007). Even then, however, there are significant financial gains to be made.

If better educated parents earn higher wages abroad, they are more likely to remit more in absolute terms and more money can be invested in a child's well-being, including education.

The results suggest that the gains are not only absolute, but also relative to peers of a similar background. Eurostat statistics suggest that a migrant parent in the EU is likely to earn more than a parent with the same education level staying in Poland, even if he works below his qualifications and faces a wage disadvantage. The gain is smaller, however, for lower levels of education. Thus, there may be a threshold at which the income gain is sufficiently big to exert positive impact on a pupil's performance at school.

Further, better educated migrants assimilate quicker (Card, 2005), which may improve their foreign experience due to their exposure to different cultures, more diverse network of contacts and better access to the labour market. They may then transfer some of the gained cultural capital onto their children, which may be beneficial to school performance.

Even if the income gains are not significant enough to result in differential impacts by parental education levels, there may be other factors crucial for the size of the overall effect. For instance, parents' priorities with regards to their children may differ, depending on their education level. In particular, parents with higher educational attainment may see their children's education as very important and spend a higher proportion of income on schooling or take other steps to ensure their children perform well at school - work with them at home, etc.

Considering the data a lower proportion of parents staying in Poland are employed in migrant-sending households. They may be consciously choosing to remain at home to compensate for the absence of a family member and ensure well-being of their children. Given that the income abroad may be significantly more than double what one earns in Poland, it may suffice to improve the household finances, despite one parent leaving a job.

The parents' presence at home may mitigate the negative effects of separation, or even increase the benefits of migration, if it results in a significant increase in quality time with children. This may be particularly the case when parents are better educated and invest their time with children in activities which foster better school performance (Carneiro et al., 2013).

On balance, gains from parental emigration may increase with parental educational

attainment thanks to greater income potential and different investments made in children. Moreover, children may benefit relative to their classmates whose parents have the same educational attainment, as the migrant parent is still likely to earn more and the other parent may be able to invest more time in interactions with children, e.g. by leaving employment.[30] Further details of this argument can be found in the Appendix, Section B.7.

4.3 Lagged impacts

I observe a multitude of migration patterns in the sample. A big proportion of respondents indicated that their parents have been away a few times for short periods of time. This observation prompts a question about the effect of parental returns and subsequent departures on a child's performance; even though circular movements ensure frequent contact with the parent and hence a stronger bond, they also introduce a source of further instability into the household.

Moreover, the realisation of the emigration effects may be delayed and the full scale of the impact may be uncovered only after a certain amount of time has elapsed since departure; particularly when the separation from a migrant parent is prolonged.

I include 4 lags of the emigration status into the regression to see if the relationship between the average grade changes. Otherwise the specification is defined as before. The results are presented in Table 6.

The fixed effect regression (column (3)) produces positive, though statistically insignificant, estimates on current emigration dummy and its first lag. They are comparable with the results obtained in the fixed effects regression without lags, which reiterates the idea of no negative immediate impact of parental emigration on children's grades. From lag 2 onwards, however, the coefficients are relatively large, negative and statistically significant, ranging from 14 to 24% of the grade's standard deviation which suggests that the full effect of parental departure realises after about a year.

The lagged effect is more detrimental than the instantaneous impact, and persistent. One should be cautious when interpreting the size of these results as the majority of emigration observed in the sample is temporary and characterised by returns and subsequent departures. Less than a quarter of migrant parents have been away permanently. An

[30] If the hypothesis of the gains increasing in education, relative to children from similar backgrounds, was true, one may argue that an even bigger effect should be found for children whose migrant parents have tertiary education. It is difficult to put forward a reliable argument in this case as the number of migrant parents with tertiary education is very low and hence precise estimation of the impact is impossible. However, it is important to note that, among families where parents have tertiary education level, the employment levels for either parent are very high and comparable, irrespective of the migration experience in the family. This implies that, even if the family experiences migration, usually both parents remain employed; hence, it may be difficult for the parent remaining with children in the home country to compensate for the separation. Then the positive effect of increased household income may be offset by the impact parental departure may exert on the family.

average migrant parent spends 2 out of 6 semesters abroad and 40% of migrant fathers return and subsequently depart.

I consider various scenarios to shed light on the impact, given the migration patterns. My calculations are presented in Table 7. In Panel A I look at cases when a parent has been abroad for 2 consecutive semesters. The impact is only positive if the parent is abroad now. The effect upon return becomes negative, but dies off with time.

In Panel B I present the expected effects if a parent has been abroad for 3 consecutive semesters and find that there are gains to be made upon return, but the negative effect sets in after a year since return and is large. Again, it dies off gradually.

However, almost a third of migrant parents engage in circular migration. This case is considered in Panel C, where I assume that a parent is away for one period, back the next semester and away again throughout the three years. Then the negative effect is much smaller than in the previous two cases.

Table 6: Lagged impacts of parental emigration on children's outcomes

Dependent variable	Average grade		
	(1)	(2)	(3)
EmigrParent_{it}	-.007	-.141**	.057
	(.070)	(.068)	(.042)
$\text{EmigrParent}_{i(t-1)}$	.163**	.062	.057
	(.070)	(.072)	(.058)
$\text{EmigrParent}_{i(t-2)}$	-.077	.042	-.121**
	(.077)	(.075)	(.062)
$\text{EmigrParent}_{i(t-3)}$	-.104	.018	-.203***
	(.066)	(.075)	(.061)
$\text{EmigrParent}_{i(t-4)}$	-.115	-.136*	-.079
	(.080)	(.078)	(.050)
Individual controls	no	yes	no
School dummies	no	yes	no
Individual dummies	no	no	yes
No of observations	4716	3670	4716
No of students	2629	2051	2629

Individual controls include gender, number of siblings, parents' age, employment, educational level, whether parents divorced or one parent died. Note that no semester dummies are included in the specification as they are dropped when 4 lags of the main explanatory variable are included.
Standard errors clustered by individual level in parentheses.
Statistical significance: *** 1% ** 5% * 10%

Table 7: Impacts on the average grade of various migration patterns over time

Panel A: Parent abroad for 2 consecutive semesters					
	Abroad now	Just came back	Has been back for a semester	Has been back for a year	Has been back for 3 semesters
Overall effect on the average grade	0.114	-0.064	-0.324***	-.282***	-.079
Panel B: Parent abroad for 3 consecutive semesters					
	Abroad now	Just came back	Has been back for a semester	Has been back for a year	Has been back for 3 semesters
Overall effect on the average grade	-.007	-.267***	-.403***	-.282***	-.079
Panel C: Parent has been away every other semester in the last 3 years					
		Home now	Away now		
Overall effect on the average grade		-.146***	-.143		

Note: The calculations are based on the results for the average grade presented in Table 6. Stars next to the impacts indicate statistical significance.

The negative effect emerging after a while may be explained by various factors. For instance, detachment from a parent may be easier accepted by a child, when it is temporary and recent. Children may realise the difficulty of being apart only *ex-post* and when the parent has been abroad for long enough. The full effect of additional income flows may also be realised with a delay if migrant parents need time to settle in the destination country before sending remittances.

Children may also wish to join their migrant parent abroad; such a desire is likely to influence attitudes towards schooling and educational attainment, depending on the perception of returns to education abroad relative to the home country.

For short-term, one-off, migration episodes the observed outcome might be explained by the expected fall in income upon parental return and a difficulty to fully avert the negative effect of separation; family detachment might drive its members apart and time is required to remedy the situation.

In cases of prolonged emigration it might be that either the remittances fall with time, as the migrant parent establishes himself abroad and develops a more comfortable lifestyle, or no change in remittances takes place but the effect of separation is experienced to a greater extent. These interconnections are further complicated if one considers a possibility that children's future plans change, conditional on parental experiences; children of emigrant parents may want to emigrate too and lose motivation to excel at school as their perception of returns to education changes.

Unfortunately, I do not have means of testing the hypotheses with the data.

5 Does sibling emigration play a different role?

Sibling influence on educational performance of children has not been extensively investigated. The majority of lessons related to the role of siblings come from literature analysing interegenerational transmissions and correlations and find correlation in labour market

and education outcomes of siblings.[31] In migration literature Kuhn (2006) finds that emigration of brothers had a positive effect on schooling of children in rural Bangladesh, arguably thanks to the income capacity, and hence remittances, of migrating siblings.[32]

Siblings also often act as role models and can motivate or discourage younger children from studying, influencing human capital accumulation of the left behind children. Biavaschi et al. (forthcoming) argue that siblings, who stay at home during parental migration, are particularly influential for their younger siblings' schooling, most likely due to the changes in family roles.

To investigate whether sibling's own emigration experience may influence school performance of pupils, I add a sibling emigration dummy as a right hand side variable into the equation, which then becomes:

$$\text{average grade}_{it} = \alpha + \beta \text{EmigrSibling}_{it} + \theta \text{EmigrParent}_{it} + \gamma_i + \theta_t + \epsilon_{it} \tag{3}$$

where EmigrSibling_{it} is a dummy variable equal to 1 if at least one sibling of pupil i was abroad in semester t, EmigrParent_{it} is defined as before, γ_i are individual fixed effects, θ_t semester fixed effects and ϵ_{it} an error term.

Following on, I also add 4 lags of sibling emigration to see if there is a scope for a delayed effect.

I possess information on whether one's sibling has engaged in migratory experience prior to the observed period, although without much further detail. This division is important as those who have been migrating prior to September 2009 must be at least 6 years older than respondents and their relationship may differ, relative to one with only slightly older siblings. For that reason I separately run two sets of regressions with different groups of interest: siblings who emigrated recently and before September 2009 and siblings who have only engaged in emigration post-September 2009.

As can be seen in Table 8, impact of siblings who migrated recently is strong and significant, but only when I allow for delayed effects (column (6)); sibling migration immediately increases educational attainment by .202 - an equivalent of almost 24% of standard deviation of an average grade. If a sibling left for abroad 3 years ago and hasn't returned, the impact reaches 76.9% of standard deviation of an average grade. The effect of a one off, one semester departure dies off after a year. However, I find no impacts of emigration of those siblings who have first left before 2009.

The rationale for the positive and large impact of sibling emigration, that is persistent and accumulates over time, could be that many migrant siblings remit, positively influencing the household budgets.[33] At the same time their absence leaves parental time

[31] See Bingley and Capellari (2012); Black and Devereux (2011).

[32] Note, however, that he does not correct for selection biases and endogeneity in his work and hence the associations are not necessarily causal.

[33] Kuhn (2006) argues, however, that these remittances are much lower than the ones sent by migrant parents.

inputs into family life are unaltered. Moreover, it they may play a crucial role in encouraging educational success, especially if their migratory experience indicates high returns to education.[34]

Table 8: Impact of sibling emigration on children's average grade

Dependent variable	Average grade			
	Siblings who emigrated post-2009 only		Siblings who emigrated pre- and post-2009	
	(1)	(2)	(3)	(4)
$EmigrSibling_{it}$	.005	.202***	-.085	.001
	(.049)	(.050)	(.098)	(.130)
$EmigrSibling_{i(t-1)}$		.262***		-.148
		(.074)		(.128)
$EmigrSibling_{i(t-2)}$		.134		-.263**
		(.083)		(.115)
$EmigrSibling_{i(t-3)}$		.124		-.160
		(.085)		(.107)
$EmigrSibling_{i(t-4)}$		.190*		-.066
		(.099)		(.074)
individual fixed effects	yes	yes	yes	yes
semester fixed effects	yes	yes	yes	yes
No of observations	13413	4562	13525	4562
No of students	2583	2531	1932	1932

Source: MECP2012 I only report results of the individual fixed effects regressions. The OLS regressions produced mostly insignificant coefficients. They can be made available upon request
Standard errors clustered by individual level in parentheses.
Statistical significance: *** 1% ** 5% * 10%

More puzzling may be the fact that this impact is driven by siblings who only embarked onto migration post-September 2009. I expect them to be closer in age to the respondents than siblings with prior migratory experience. They may, therefore, still have a very strong bond with the household, remit and visit often, maintaining close relationships with younger siblings and influencing their decisions. Assuming that they were of age at point of emigration, siblings who left the country prior to 2009 must be at least 6 years older than respondents. In this case the age gap may change the relationship between siblings into a more parental one. Additionally, these siblings are likely to already have their own families and hence neither remit nor come back to their parents' home as often. Therefore, the impact may diminish. Unfortunately, I cannot test these hypotheses at this stage.

[34]This may be the case since young people's migratory experience and employment opportunities often differ substantially from those awaiting their parents - they often know the language of the destination country, are more entrepreneurial, flexible and mobile (Nowicka, 2002).

6 Conclusion

I consider impacts of parental and sibling emigration on educational attainment of 16-year-olds. I utilise a unique data set with student-level information about teenagers in a high migration region of Poland and estimate the results using regressions with individual and semester fixed effects. The effect is thus identified on within-family over-time variation in the migratory experience.

Parental emigration has a small and positive immediate impact on educational attainment of children. This may be thanks to the short-term, circular nature of parental migration in the sample, which is likely to lower any potential burden on PWA children and to more effectively channel positive aspects of international experiences, such as increased income, exposure to other cultures and possibly changed perception of returns to education.

However, not everyone benefits. The greatest gains are made by children whose migrant parents are high school graduates. More importantly, PWA children whose parents have lower than secondary education, who constitute about 67% of the overall group, do not improve their performance as a result of their parents' emigration, relative to their peers of similar socio-economic background. I associate it with a different allocation of household resources and parental involvement in child's education, depending on the parents' own education level as well as differential experiences and income opportunities abroad.

This finding contradicts a number of outcomes from other case studies. The difference between the economic, cultural and social situation in Poland and in other source countries may be one of the reasons. In the Polish case, parental emigration is unlikely to result in school dropouts. Rather, the impact is more subtle and limited to an increase in household responsibilities. Moreover, given that emigration is legal and travel to Poland relatively short and affordable, the respondents in my study are in frequent contact with the parent abroad and suffer less from the feeling of abandonment than, say, children in Mexico whose parents work illegally in the USA. Contact is also maintained thanks to wide-spread use of internet communication and mobile networks. Additionally, in most cases the emigrant parents leave children with a family member, who takes over parental duties, minimising the negative impact of the departure.[35]

My findings are in line with studies of Chen et al. (2009), Antman (2011b) and Hanson and Woodruff (2003), all of which demonstrate that parental emigration can have none or positive impact on the education of children. The size of the effect I find is less

[35] A similar argument was used by Chen et al. (2009) in their study of Chinese rural-urban migration; children were left with family members and were not burdened with additional workload, whilst the household as a whole received an increased income. Biavaschi et al. (forthcoming) also argue that adjustments within the family left behind may generate benefits or at least reduce hardships. This is not to say that the emotional burden of family detachment is negligible.

striking which may be attributed to a smaller income effect; the differences between the economic situation, standard of living, incomes and purchasing power in Poland and the destination countries of Poles are smaller than between Mexico and the destination countries of Mexicans. Hence, the potential for increased income due to emigration is also smaller. Should the negative impact of family detachment due to emigration be comparable in the two cases, the overall positive influence of emigration will naturally be smaller in the Polish case. The difference stems from a changed balance between the effects at play relative to earlier studies.

If prolonged, parental migration may exert a negative effect; how detrimental it is depends on the nature of migration. This negative relationship suggests that when parent is absent for a long period of time the income effect is outweighed by the negative influences of migration. The results are in line with various publications in the field.[36] However, the justification for such outcomes differs due to divergence in migration contexts. It is unlikely that respondents in my study perform worse at school due to greater responsibilities, which is usually the argument proposed in literature. In most cases they stay with the other parent during emigration and hence do not need to take on adult responsibilities in the household. I do not observe school dropouts either. The negative effect of emigration is most likely emotional.

I also find a strong, positive impact of sibling emigration on average grades of 16-year-olds. It is likely that siblings act as role models, encouraging educational effort and also send remittances, increasing the household's income. Sibling migration is likely to foster openness and provide an international outlook on opportunities for young people, which may facilitate human capital accumulation. Unfortunately, due to data limitations, I am unable to test these suggestions.

Despite its various caveats, this analysis sheds new light on the role migration plays in human capital accumulation. It seems that migratory experiences, which are temporary, repeated and rather short-term in nature, and during which a sibling or only one parent engages in employment abroad, may, under certain circumstances, benefit some children staying in the home country. The story is very complicated, however, and depends heavily on family circumstances, as well as the type of migration a family member engages in.

Therefore, my work also highlights the importance of heterogeneity analysis in this context and of use of an array of approaches to create a comprehensive view of the analysed situation. Even if partial, this is one of the first few analyses to acknowledge the different nature of European migration from the labour flows studied to date and to investigate various elements of the complicated temporary migration patterns observed in Europe.

Given that such migratory movements are increasingly common among the new EU member states, these findings may be informative of the situation in Europe.

[36] See McKenzie and Rapoport (2011); Antman (2011a); Cortes (forthcoming); Kandel and Kao (2001).

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Online Appendix
Out of sight, out of mind? Educational outcomes of children with parents working abroad.
(not intended for publication)

Joanna Clifton-Sprigg *

March 18, 2015

Abstract

This online appendix accompanies my paper "Out of sight, out of mind? Educational outcomes of children with parents working abroad". It is organised in two parts. In Part A I provide detailed characteristics of the migratory movements captured in the data and discuss the representativeness of the data. Part B deals with various aspects of estimation touched upon in the main paper. In particular, in Section B.1 I provide information about the local economy of Opolskie and in Section B.2 I present results of the regressions with leads of the explanatory variable. Section B.3 contains the argument about selection into migration. In Section B.4 I look at the migration situation of pupils who dropped out of the class register. The results of the analysis using test scores as a main dependent variable can be found in Section B.5. In Section B.6 I consider a lagged dependent variable specification as an alternative to the approach taken in the main paper. Finally, in Section B.7 I discuss the employment opportunities of PWA abroad.

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A Migration and Education of Children in Poland data

In this part of the appendix I provide further details on MECP2012 data which is discussed in Section 2 of the main paper. The complete documentation related to the data collection project can be found on https://sites.google.com/site/joannacliftonsprigg/data.

A.1 Migration characteristics

The tables below provide details of the migratory movements described in Section 2.4.2 of the main paper.

Table 1: Destinations of migrant parents

country	mothers		fathers	
	N	%	N	%
Germany	100	64.52	222	64.35
the Netherlands	38	24.52	63	18.26
the UK	7	4.52	16	4.64
Austria	1	0	8	2.3
Ireland	2	1.29	7	2.03
other destinations	7	4.52	29	8.41
total	155		345	

Source: MECP2012

Table 2: Patterns of emigration in the sample

	fathers	mothers	either parent
away entire time	123	16	139
left	57	14	71
returned	142	56	198
cyclical migration	137	67	204
total	459	153	612

Source: MECP2012

A.2 Representativeness of the sample

As mentioned in Section 2.5 of the main paper, despite the fact that the initial descriptive statistics from the collected data reflect what we know about migrant families in Opolskie, one may be concerned that the collected data is not representative of the studied population. Schools and participants can opt out of the study, which may compromise the representativeness of the sample if the non-participation is not random. In this section I argue that school and participant selection can be thought as almost random.

Another worry is that Opolskie may not be representative of the situation in Europe, as it has been experiencing high levels of population outflow, both historically and in recent years. The scale and persistence of the phenomenon may have led to a different response of families to temporary migration. For example, there may be policies in place to support migrant-sending

families. Moreover, if having a parent working abroad is perceived as a norm, children may differently react to it than if migration was a new phenomenon. Thus, the situation in Opolskie may differ from that in the rest of Poland and other European migrant-sending countries.

A.2.1 School selection

The selectivity of schools may be a concern if schools which opted out from cooperation are believed to be differently affected by the phenomenon studied; for instance, I may find that PWA children's grades do not differ from other pupils' and conclude no impact of emigration on school performance. However, due to self-selection of schools, there might be a number of differences between the PWA children in participating schools and those, who were excluded from the study. Perhaps the participating schools agreed to cooperate because they do not perceive emigration as problematic and the children included in the sample were not affected, whilst those excluded might have been.

The feedback given by schools, however, undermines the argument of schools' self-selection into the study when emigration within pupils' families does not cause problems. Participant schools perceive emigration as problematic.

Although the problem of schools' self-selection should not be neglected, participation decisions might not have been driven by migration situation in the school. The engagement in the project required additional effort from the schools' administration in form of grade provision and their pupils' time. This in itself became a discouraging factor. The negative attitude might explain why as many as 35 of the institutions, who refused cooperation provided no sound reason for the refusal; 13 schools expressed concerns about the timing of the project, which coincided with audits, lay-offs of teachers and school trips. Only 8 schools stated clearly that the problem lay in the request to access information on performance of children and their family situation; this data was perceived as sensitive.

As can be seen from Figure 1, the participating schools are equally spread across the entire region. The highest percentages of respondents in the whole sample come from *opolski*, *oleski* and *strzelecki* counties; these areas are also among the top five emigration areas in the region. Only *krapkowicki* and *kędzierzyńsko-kozielski* counties with the highest number of migrants in 2002 could be of concern, given that local schools were reluctant to cooperate there.

In most cases, again with exception of *krapkowicki* county, the refusal of schools to cooperate coincided with low population density in the area (see Figure 1), indicating that the most populous areas have been well captured in the study.

The following counties have been particularly well-covered: *oleski, namysłowski* and *strzelecki*. As mentioned before, *oleski* and *strzelecki* counties are characterised by one of the highest emigration rates. A response much below the province average has occurred in *brzeski, glubczycki* and *kędzierzyńsko-kozielski* counties. The last one might be of concern, given a relatively high temporary out-migration from the region. However, a different light may be shed on the earlier concern about the underrepresentation in *krapkowicki* county; the participation rate in the study in this county is still lower than the province average, but it is not the lowest

across the areas covered.

Further, the counties with a large number of temporary migrants staying abroad according to the 2002 Census are relatively well-represented in the study (see Table 3). At the province level, almost half of the contacted schools participated in the study, providing a capture of over a third of all students (see Figure 2).

Even if the areas are unequally represented in the data set, the counties do not differ strikingly in terms of their local economy. From Table 3 it is clear that the average gross salary and wages in 2011 mostly varied between 2730.02 PLN (in *prudnicki* county) to 2872.04 PLN (in *opolski* county) (The Central Statistical Office of Poland, 2012). The only exceptions are *krapkowicki* and *kędzierzyńsko-kozielski* counties, where the average gross salaries reach 3798.54 PLN and 3518.97 PLN respectively. These two outcomes are closer to the national average which was 3315.38 PLN in 2011 (The Central Statistical Office of Poland, 2012). The difference is driven by the existence of an industry in both counties, in contrast with the rest of the predominantly rural province.

Table 3: Emigration rates and economic situation in the counties

County	Emigration (%)	Unemployment (%)	Wages (PLN)	% of 3rd year pupils	% of respondents
Brzeski	3.11	20.5	2795.69	10.09	4.75
Glubczycki	5.57	17.9	2878.02	4.89	2.08
Kedzierzynsko-kozielski	12.65	13.1	3518.97	9.62	5.61
Kluczborski	8.08	15.5	2848.38	7.35	10.43
Krapkowicki	16.60	10.9	3798.54	6.45	4.54
Namyslowski	4.35	18.6	2833.22	4.62	6.30
Nyski	4.63	19.4	2733.31	14.71	10.25
Oleski	12.07	8.9	2731.82	6.74	15.80
Opolski	17.98	13.1	2872.04	12.64	16.38
Prudnicki	9.95	18.6	2730.02	5.76	6.58
Strzelecki	17.27	11.7	2929.69	7.53	11.40
miasto Opole	4.99	6.4	3541.80	9.60	5.89

Emigration: number of people staying temporarily abroad for over 2 months as % of the population in Census 2002
Unemployment: registered unemployment rate in 2011
Wages: average gross salaries and wages in 2011, in PLN
Source:
emigration data: the 2002 Census, Central Statistical Office of Poland, own calculations
unemployment and wages data: Central Statistical Office of Poland

Failure to fully represent areas of higher average income might impact the analysis. Given relatively higher incomes of families and the relationship between household budget and educational attainment of the offspring, children in *krapkowicki* and *kędzierzyńsko-kozielski* counties might be on average better off before, as well as after, parental emigration relative to children in other areas. Moreover, considering the high out-migration from the two areas, the increased average income might signal a significant remittance flow, not just the existence of local industry. All of these factors may lead to better school performance of children from the area.

Looking at the statistics presented in Table 4, however, it becomes clear that the school performance of respondents from the two counties in question does not differ from the average in the sample; if anything, the children seem to perform slightly worse on average.

The variance in unemployment in the province is much higher, with a clear divide of higher unemployment in the western part of the region, where the emigration rate is lower. As expected, the lowest level of unemployment is in the capital city of the region, Opole. It is

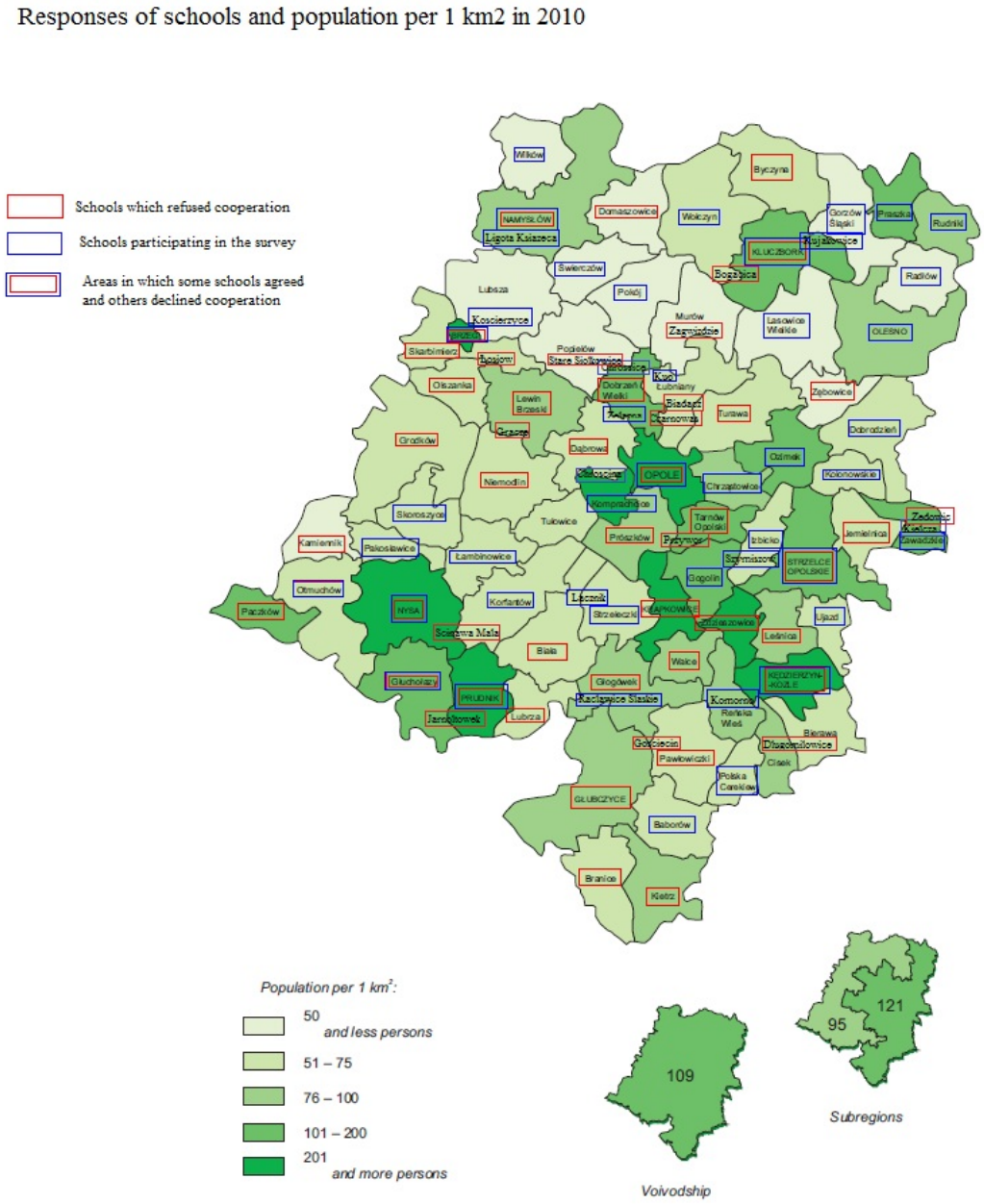

Figure 1: Map of school responses, Source: Central Statistical Office of Poland and own calculations

Table 4: Respondents' school performance (average grade)

	n	mean	std. dev.
overall sample	2822	3.610	0.850
kędzierzyńsko-kozielski	340	3.392	0.852
krapkowicki	150	3.575	0.845
all other schools	2332	3.621	0.849

Source: MECP2012

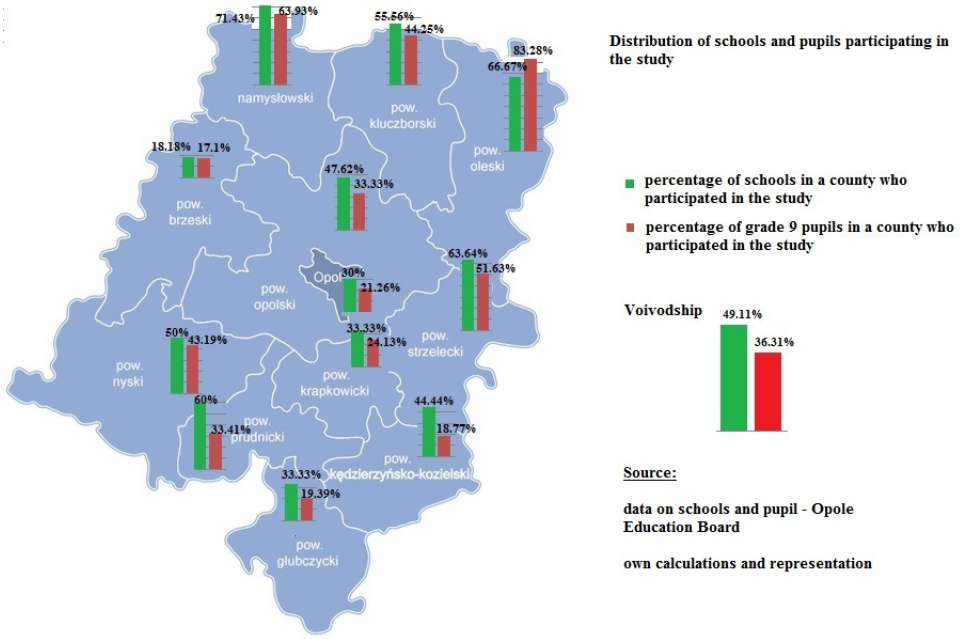

Figure 2: The participant schools and pupils as a percentage of total number of schools and pupils in counties

likely that the lower unemployment in the eastern part of the region is driven by a significant and regular outflow of the working-age population. The unemployment in *krapkowicki* and *kędzierzyńsko-kozielski* counties are close to the province average.

I assess the quality of participant and non-participant schools in the area by comparing the average outcomes of their pupils in the final exam in 2012.[1] Any differences in performance between the two groups may suggest that indeed schools have selected into the study in a non-random way. The results are presented in Table 5. Pupils in non-participant schools performed worse on average in the final exam, but the differences are insignificant and support the conclusion that the respondent group is representative of the entire population.

Table 5: Average test scores in 2012 in schools in Opolskie

	Participant schools		Non-participant schools		
	Mean	St.dev.	Mean	St.dev.	T-stat
Humanities test score	62.251	6.152	61.572	6.197	.629
Science test score	48.554	7.249	48.142	6.088	.344
N	52		88		

Source: MECP2012

A.2.2 Pupils' participation decision

Another estimation challenge arises if respondents select into the study in a non-random manner. A request to disclose personal information is more likely to prompt a refusal to answer the questionnaire. One particular worry is that, given the sensitive nature of migration in

[1]The exam was taken by the final year pupils, which are the respondent group in this study.

Poland, individuals in the treatment group may refuse to cooperate or may answer the questions partially. It may also be argued that even when students do not self-select actively, their non-attendance to school on the day is a form of self-selection. This should be of concern if we believe that students who are more likely to miss school on the day differ significantly from their peers, especially if they also are PWA children. Then the results do not reflect the situation fully.

Table 6: Survey response rate

	n
total of pupils in surveyed schools	3423
pupils present during the survey	2863
total number of responses	2822
average response rate of total pupils of the school	82.47%

Source: MECP2012

Table 7: Average outcomes for respondents and non-respondents

	Respondents		Non-respondents		
	Mean	St.dev.	Mean	St.dev.	T-stat
average grade	3.61	0.850	3.412	0.851	4.987
behavioural grade	4.489	1.240	4.259	1.291	3.840
number of hours missed not excused	12.131	30.802	19.904	46.281	3.932
N	2822		548		

Source: MECP2012

There have been no signs of self-selection within the chosen schools, however. As can be seen in Table 6, the majority of pupils present at school on the day of the study filled in the questionnaire. The response rate among the pupils present varied from 89.66 to 100% across participating schools. The number of respondents constituted on average 82.47% of the overall school population.

In Table 7 I present a summary of outcomes for students who took part in the survey and those who did not respond or were absent at school on the day. The non-respondents have on average lower average grade, worse behavioural grade and miss more school without an excuse. The differences between students who participated in the study and those who didn't are statistically significant. This may have implications for validity of the results presented in the main paper if the non-participation was non-random. In particular, one may be concerned that PWA pupils are overrepresented among the non-respondents and that their parents' migration decision is related to their worse school performance.

A.2.3 Situation in other regions in Europe

Poland and the region of study were not chosen randomly. They were targeted in order to capture a sufficiently large sample representing the population of interest - the children in lower secondary education who have parents temporarily employed abroad.

To be able to generalise the results in the main paper I need to ensure that 1) Opolskie does not differ from the rest of Poland and other regions in Europe in terms of the scale of the phenomenon studied and 2) that the effect is likely to be similar in other areas.

In particular, the relationship between parental migration and students' educational performance may depend on the broader context in which migration takes place. The scale and persistence of the phenomenon may play a role. As mentioned before, schooling in a region which has newly experienced migration may be differently affected by it than in a region in which migration is a norm.

I will highlight similarities between Opolskie and other regions of Poland, as well as other European countries to argue that the results can be generalised to an extent. Unfortunately, the discussion is constrained by the scarce data on temporary migration and PWA children in other regions.

Migration levels in Opolskie and other regions of Poland

Opolskie has experienced prolonged high levels of emigration, both temporary and permanent. The region had the highest in Poland number of temporary migrants per 1000 residents in Census 2011, which was twice the country average.

However, I am interested in the very specific subgroup of temporary migrants who have teenage children still living in Poland. Migration levels for this group may differ from the overall outcome. The 2011 Census does not provide information about temporary migrants by family status. Therefore it is difficult to establish whether migration rates for this particular group are also disproportionately high when compared with the rest of Poland.

I make comparisons across age groups, relying on the fact that the average age for a migrant mother in the sample is 40 years old and for a migrant father 43 years old. In Table 8 I present information about the rates of temporary migration in all regions of Poland for individuals aged 30-39 and 40-49 as well as the percentage of households in a region with at least one temporary migrant. Also here the migration rates are the highest in Opolskie.

The age-specific group comparisons are not ideal, however, as being of certain age is not a perfect indicator of having a child in lower secondary education. There should, nonetheless, be a correlation between the two.

PWA children and their parents in other regions of Poland

Ideally, I would like to compare the statistics on a number of PWA pupils in other regions of Poland. Comprehensive comparisons with other regions of Poland are impossible as no detailed data on PWA children in Poland exist. However, a few localised studies, results of which are outlined in Table 9, have been undertaken in recent years.

It is important to acknowledge the limitations of this exercise. The studies mentioned here are piecemeal, descriptive and sometimes based on a small sample of respondents. They also asked respondents different questions, so the statistics are not always directly comparable. All of them, however, have selected participants in the given region in a randomised manner.

Table 8: Further migration information from 2011 Census

Region of Poland	% of temporary migrants by age group		% of households with a temporary migrant
	Aged 30-39	Aged 40-49	
Dolnośląskie	11.4	6.9	11.0
Kujawsko-Pomorskie	9.3	5.2	9.6
Lubelskie	10.4	5.4	9.9
Łódzkie	5.6	2.9	11.2
Małopolskie	10.4	6.5	5.6
Mazowieckie	4.7	3.3	5.4
Opolskie	19.4	15.9	17.8
Podkarpackie	16.0	8.3	15.9
Podlaskie	17	10.7	15.2
Pomorskie	10.2	6.8	10.8
Śląskie	8.6	6.2	8.9
Świętokrzyskie	9.9	5.1	10.0
Warmińsko-mazurskie	13.5	7.5	13.3
Wielkopolskie	5.8	3.1	6.6
Zachodnio-pomorskie	11.7	6.6	11.2
Poland	9.5	5.9	9.9

Source: 2011 Census, the Central Statistical Office of Poland

According to the sample statistics almost 18% of pupils in lower secondary schools in Opolskie had a parent abroad at some point in the observed 3 year period. On average, however, about 7% had a parent abroad in a given semester t, since migratory movements in question are temporary. In majority of cases fathers engaged in emigration and spent relatively short periods of time abroad.

Studies suggest that between 7 and 11% of pupils of lower secondary schools in the studied regions had a parent abroad. This is a lower percentage than in my data. However, the respondents in these cases were usually asked whether their parent was abroad at the time of the survey; the studies did not collect retrospective information. I find that on average only 7% of respondents in MECP2012 data had a parent abroad at a given point in time, which is closer to what the studies in question report. Moreover, official statistics based on information provided by schools may underestimate the scale of the problem, as parents often do not inform schools of their emigration.

The report by Walczak (2006) on the situation in Mazowieckie region of the country, capturing the capital city of Warsaw, is by far the most comprehensive and reliable. It provides further information about the situation of PWA children in the region. In particular, the author points out that in majority of cases only one parent emigrates, usually the father. Parental migration is short term, with an average length of stay of 5.7 months. These characteristics closely reflect those of the PWA families in MECP2012 data. The two groups are also comparable with respect to PWA parents' age and education levels.

Importantly, a report by the European Commission (DG Employment, Social Affairs and Inclusion, 2012) suggests that 15% of Polish children are PWA children. This is closer to the statistics obtained from MECP2012 data. It is stressed, however, that the estimates bear

Table 9: PWA pupils in other regions of Poland

Region	Author	Info on PWA pupils
Zachodnio-pomorskie	Zajączkowska (2008)	7% of pupils in lower secondary schools almost always one parent abroad
Mazowieckie	Walczak (2006)	11.3% of pupils in lower secondary schools 9.1% had a father abroad 3.7% had a mother abroad average stay abroad: 5.7 months average age of migrant mother: 38 average age of migrant father: 43
Podlaskie	Regionalny Ośrodek Polityki Społecznej w Białymstoku (2011)	6% of pupils had a father abroad 2% of pupils had a mother abroad
Poland	DG Employment, Social Affairs and Inclusion (2012)	15% of pupils aged 9-18

significant uncertainty and imprecision.

Although rather scant, the evidence is suggestive of similarities in terms of the scale of the phenomenon across regions of Poland.

Different response to migration depending on the scale and circumstances

There is some evidence that the percentage of PWA children in Opolskie is not as high relative to the rest of the country as the general migration statistics are suggesting. The greater migration from Opolskie will be problematic for generalisation of results if it shapes differently the relationship between having a parent abroad and school outcomes or the spillover effect of that relationship.

This is likely if, due to the prevalence of the phenomenon, the region authorities have introduced policies to target PWA children. To the best of my knowledge no such policies exist. However, it is still possible that individuals respond differently to having a parent abroad if parental migration is a common occurrence in their environment. In particular, the effect of separation from a parent in a high migration region may be less pronounced as having a parent abroad is perceived as normal. However, in case of Poland the burden of separation is thought to be relatively small due to the nature of parental migration.

If the large scale migration had a different impact in the specific context of schooling, one may expect to see different performance of pupils across the regions of Poland depending on their experience of migration. I do not possess the individual level schooling data for Poland, but in Table 10 I present the average results of the national exams for the relevant cohort, by region. Students in Opolskie performed on or close to the average in the exam. There are no strong indications of their differential performance.

PWA children in other countries

Can the results be generalised beyond Poland? Poland and most countries which joined the European Union in and after 2004 share common experiences related to the economic and political changes over the past 20 years. Many of them have moved from socialist to market based economies and introduced democracy over a short period of time. These changes put them on a similar footing in terms of economic performance nowadays, although they all face

Table 10: Average Test Scores (%) in the National Exam in 2012

Region of Poland	Polish	History	Maths	Science
Dolnośląskie	63	60	46	49
Kujawsko-Pomorskie	64	59	46	49
Lubelskie	67	61	47	50
Łódzkie	65	60	46	49
Małopolskie	69	63	50	51
Mazowieckie	67	63	50	52
Opolskie	63	60	47	49
Podkarpackie	67	62	49	51
Podlaskie	64	61	49	51
Pomorskie	62	59	47	49
Śląskie	66	61	47	50
Świętokrzyskie	65	60	46	49
Warmińsko-mazurskie	62	60	46	49
Wielkopolskie	63	60	46	49
Zachodnio-pomorskie	62	59	45	49
Poland	65	61	47	50

Source: Centralna Komisja Egzaminacyjna

country-specific difficulties.

In particular, they all strived to join the European Union, which committed them to meeting certain economic and political conditions to allow free movement of goods, services and individuals. Following the EU accession they have all experienced significant migratory flows, which were in some instances restricted over the initial membership period. According to DG Employment, Social Affairs and Inclusion (2012) the stock of the EU-10 nationals residing in the old Member States tripled over the period between 2003 and 2009.

It is difficult, however, to precisely estimate the resultant migratory flows (particularly when they are temporary) due to the nature of the movements within the EU. In particular, statistics provided by Eurostat are based on immigration data supplied by the member states using administrative records, sample surveys or estimates; these sources focus mostly on long-term migrants and are unlikely to capture temporary migration well.

Moreover, the generalised migration statistics are unlikely to provide accurate information about the group of interest. The situation of PWA children in the EU and Europe more broadly has not been extensively studied. However, in Table 11 I provide information on the few available analyses which help shed light on the scale of the problem. Once again, this is a collection of results from various sources, based on different measures and often targeting different groups of children. Importantly, there is considerable uncertainty attached to the estimates.

Most analyses indicate that between 15 and 22% of children in various new EU member states and other Eastern European countries have a parent working abroad. This number reflects my findings in the MECP2012 data, which appears reassuring for representativeness of the data for Europe.

Table 11: PWA pupils in other European countries

Region	Author	Info on PWA pupils	Comments
EU as a whole	DG Employment, Social Affairs and Inclusion (2012)	500 000 PWA children	the estimate is uncertain
Poland	DG Employment, Social Affairs and Inclusion (2012)	15% of pupils have a parent abroad	info for all children aged 9-18
Romania	Botezat and Pfeiffer (2014)	2% of children aged 0-18 have a parent abroad	official statistics data for year 2008
		20% of students enrolled in high school have a parent abroad	an independent survey in 2007
		21% of children in grades 5 to 8 have a parent abroad	data from Gallup International for year 2007 parent abroad for at least 12 months
	DG Employment, Social Affairs and Inclusion (2012)	85 000 children have at least one parent abroad	official government report in 2011
	DG Employment, Social Affairs and Inclusion (2012)	350 000 children have at least one parent abroad i.e. 7% of all children aged 0-18	UNICEF report in 2007
Lithuania	DG Employment, Social Affairs and Inclusion (2012)	9500 PWA children	
Bulgaria	DG Employment, Social Affairs and Inclusion (2012)	problem recognised but no data	
Latvia	DG Employment, Social Affairs and Inclusion (2012)	problem recognised but no data	
Estonia	DG Employment, Social Affairs and Inclusion (2012)	problem recognised but no data	
Moldova	Botezat and Pfeiffer (2014)	17% had at least one parent abroad	info for all children aged 0-18
Albania	Botezat and Pfeiffer (2014)	22% live in a migrant household	info for all children aged 0-18

At the same time, some sources provide much lower estimates. In particular, according to the official statistics for Romania 2% or 7% of children have a migrant parent. This is likely due to severe underreporting of temporary migration to the authorities. The estimates on the higher end of the spectrum probably reflect the actual situation more closely.

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Thank you for agreeing to participate in the survey. Your answers will be treated **anonymously** and will only be used in my PhD project. Answer the questions honestly. There are no incorrect answers. If you feel that none of the given choices reflects your situation, try to choose the best alternative answer. **Circle your chosen answer or tick the box if required**. If you choose 'other' as your answer, please elaborate.

1. Class .....
2. Number in class register .....
3. Year of birth ……

4. Gender: Female / Male

5. What nationality are you?
   Polish / Polish and German / Other:……

6. What is your parents' nationality?

	Polish	Polish & German	Other (what?)
mother			
father			

7. How many siblings do you have?

0	1	2	3	more

8. What is your birth order in the family (e.g. if you are the oldest, circle 1)?

1	2	3	4	Higher order

9. What age group are your siblings? More than one answer is possible.

0-5	6-10	11-15	16-18	Older than 18

10. Do you live with both parents?
    Yes / No
    a. If not, why? ……

11. If you do not live with both parents, who do you live with?
    mother / father / grandparents / another family member / someone else: .....

12. Does your mother have a job? Yes / No
13. What is your mother's age? .....

14. What type of school has your mother graduated from?

podstawową	zawodową	liceum / technikum	studia

15. What is your mother's profession? (e.g. teacher, cook, hairdresser)
    .....

16. Does your father have a job? Yes / No
17. What is your father's age? .....

18. What type of school has your father graduated from?

podstawową	zawodową	liceum / technikum	studia

19. What is your father's profession? (e.g. mechanic, doctor, driver)
    .....

20. Do you attend any after-school activities/ classes?
    Yes / No
    a. If yes, of what kind. Tick all correct answers

sports	
languages	
art	
course related	
volunteering	
other (what kind?)	

21. Are these after-school activities organised by your school?
Yes / No / Some of them are

22. Are you intending to apply to attend university after secondary school?
Yes / No

23. Are you planning to leave for work abroad after graduating from secondary school?
Yes / No

24. Do your parents have family or friends abroad?
Yes / No

25. Has your mother, father or sibling recently moved abroad?
Yes / No

If you answered positively to Question 25, please answer the remaining questions. Otherwise this is the end of the survey.

26. Who in your family has recently emigrated?

mother	father	siblings

27. Where has your family member left to? Please state country and city/region.

	mother	father	siblings
country			

28. Has any of family or friends living abroad helped your family member to emigrate? (e.g. by finding job or accommodation)

Yes / No / I do not know

29. **Tick the box only if** your mum/ your dad / your sibling **was staying abroad** in a given time period:

	mother	father	siblings
just before September 2009			
I semester of 1st year (2009/2010)			
II semester of 1st year (2009/2010)			
summer of 2010			
I semester of 2nd year (2010/2011)			
II semester of 2nd year (2010/2011)			
summer of 2011			
I semester of 3rd year (2011/2012)			
II semester of 3rd year (2011/2012)			
He/ she has emigrated permanently			

Only answer questions 30 – 33 if one or both of your parents emigrated.

30. If your parent is/ was abroad, how often do/did you see her / him?

	once a month or more often	every 6 months	once a year	more rarely than once a year
mother				
father				

31. If your parent is/ was abroad, have you ever been to visit him/her?
Yes / No

32. Do you feel you have more home responsibilities (e.g. housework, caring for siblings), because of the departure abroad of your relative?
Yes / No

33. Do you think your grades have been affected by the emigration in your family?
Yes / No

a. If yes, in what way? Positive / Negative

B Parental migration and educational performance of pupils

Table 12: Differences in outcomes between semester 2 and semester 1 within each year

	Year 1			Year 2			Year 3		
	Overall	**Migrant**	**Non-migrant**	**Overall**	**Migrant**	**Non-migrant**	**Overall**	**Migrant**	**Non-migrant**
Δ Average grade	0.059	.069	.056	.136	.134	.137	.262	.256	.264
	(.307)	(.313)	(.305)	(.285)	(.287)	(.285)	(.284)	(.259)	(.295)
N	2161	622	1513	2222	641	1552	2215	662	1528
Δ Behaviour	.001	-.024	.007	.159	.195	.144	.342	.361	.334
	(.774)	(.794)	(.766)	(.750)	(.732)	(.756)	(.732)	(.771)	(.717)
N	1892	544	1323	1999	586	1386	1898	568	1307
Δ School attendance	6.163	8.678	5.132	8.348	8.711	8.228	11.985	16.767	10.403
	(26.339)	(29.920)	(24.834)	(25.493)	(28.571)	(24.249)	(29.385)	(35.581)	(26.852)
N	1151	329	811	1171	346	813	726	189	528

Source: MECP2012
Note: standard deviation provided in parentheses

B.1 Local economy of Opolskie in years 2009-2012

Table 13: Economic indicators for Opolskie in period 2009-2012

Economic indicator	Unemployment rate (%)				Average wages (PLN)			
Year	2009	2010	2011	2012	2009	2010	2011	2012
Opolskie province	12.9	13.6	13.3	14.4	2987.87	3137.29	3249.58	3358.42
By county								
brzeski	18.7	20.5	20.3	21.0	2687.60	2795.69	2962.78	3067.56
glubczycki	16.3	17.9	18.0	19.8	2750.66	2878.02	3031.11	3111.54
kedzierzynsko-kozielski	12.5	13.1	12.9	14.5	3363.79	3518.97	3753.82	3793.84
kluczborski	15.1	15.5	15.2	15.2	2730.08	2848.38	2994.99	3200.22
krapkowicki	11.6	10.9	10.1	10.9	3602.56	3798.54	3597.89	3720.00
namyslowski	17.8	18.6	18.1	19.2	2671.86	2833.22	2974.33	3152.42
nyski	18.5	19.4	19.0	21.4	2612.02	2733.31	2846.85	3012.34
oleski	8.6	8.9	10.2	10.6	2622.70	2731.82	2868.91	3013.57
opolski	12.1	13.1	12.2	13.5	2681.01	2872.04	2785.98	2948.63
prudnicki	16.8	18.6	18.6	19.5	2594.65	2730.02	2958.74	3052.97
strzelecki	11.8	11.7	10.2	11.3	2839.95	2929.69	3079.75	3221.15
city of Opole	5.9	6.4	6.2	7.1	3352.46	3541.80	3714.16	3771.22

Source: Central Statistical Office of Poland, database can be accessed on
$http://stat.gov.pl/bdlen/app/strona.html?p\_name=indeks$

B.2 Regressions with leads of migration variable

Reverse causality and the possibility that children's school performance may trigger returns from emigration pose a threat to validity of the estimated parameter of interest. One way to check how likely these two cases are to arise is to include leads of the emigration variable into the regressions. I present the estimates of such a regression in Table 14 and conclude that there is no strong evidence to suggest that this is taking place here.

Table 14: Regression results with leads of emigration variable

Dependent variable	**Average grade**											
	OLS	OLS	FE	OLS	OLS	FE	OLS	OLS	FE	OLS	OLS	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$emigration_t$	-.044	-.002	.053*	-.054	.009	.082**	-.077	-.019	.059	-.041	-.004	.046
	(.042)	(.044)	(.029)	(.052)	(.055)	(.035)	(.067)	(.074)	(.042)	(.085)	(.091)	(.043)
$emigration_{t+1}$	-.110***	-.108**	.001	-.056	-.050	.024	-.094*	-.057	.034	-.114	-.081	.020
	(.041)	(.042)	(.024)	(.040)	(.041)	(.030)	(.052)	(.053)	(.037)	(.071)	(.077)	(.062)
$emigration_{t+2}$				-.051	-.063	.003	.017	.015	.031	-.002	.030	.081
				(.048)	(.047)	(.028)	(.050)	(.049)	(.038)	(.073)	(.074)	(.055)
$emigration_{t+3}$							-.015	-.039	.058	.054	.061	.117**
							(.066)	(.066)	(.042)	(.074)	(.075)	(.054)
$emigration_{t+4}$										-.076	-.111	-.012
										(.066)	(.068)	(.044)
controls	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO
no of observations	11593	9099	11593	9127	7177	9127	6588	5192	6588	4493	3541	4493
no of students	2653	2067	2653	2573	2011	2573	2541	1993	2541	2462	1936	2462

Source: MECP2012
Controls include: sex, sibling, education, employment and age of parents, and school dummies
Clustered standard errors in parentheses.
Statistical significance: *** 1% ** 5% * 10%

B.3 Endogeneity of emigration

In this section I elaborate further on the threats selection into migration poses for estimation (Section 3 of the main paper) and how likely are these cases in the data.

Households select into emigration (Gibson et al., 2010). More specifically, the following elements of the emigration decision may be endogenous:

1. Households decide to engage in emigration.

2. Households also decide whether one family member or all should emigrate.

3. Some emigrants decide to return from emigration, whilst others stay abroad permanently.

4. Emigrants also decide on duration of their emigration experience.

Firstly, the decision to send a family member abroad may be correlated with certain characteristics, such as the socio-economics discussed above, which also influence a child's performance at school. Provided these traits do not vary over time, they will be isolated by the fixed effects approach.

A further source of selectivity is the decision of a household whether all or only some family members should emigrate. Naturally, when entire families emigrate, they are not captured in the data and the approach essentially compares households which never had emigrants with those who sent only some family members abroad.

If the households who emigrate with children differ from those who leave children behind, e.g. are wealthier, and these differences affect educational attainment, then the estimates will be biased, as the comparison will be made only between a selected group of migrants and non-migrant families (Steinmayr, 2013; Gibson et al., 2010; McKenzie and Rapoport, 2007). Although I cannot control for this type of selection in the sample, I argue that it is unlikely or the scale of the problem is rather small in my sample.

Looking at Table 15, it is clear that, although many students disappear at some point from the class register, this is due to failing to pass the year, a change of class or change of school. Only 67 students disappear from the register for unknown reasons; even then it is unlikely all of them leave the country.

Table 15: Changes in class composition over the observed period

total number of registered students:			3423
number of surveyed students:			2822
dropped out:	229	joined the school	109
failed a year	229		
transferred to another school	1	transferred from another school	3
went abroad	1	came from abroad	0
died	1		
do not know why	67	do not know why	106
transferred to another class in the same school:			10

Source: MECP2012

Table 16: Departures and arrivals of children born in 1996 from abroad into Opolskie

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	total
Emigration	16	14	17	7	24	25	28	13	14	25	183
Immigration	4	4	3	5	2	10	3	7	2	4	4

Data: Central Statistical Office of Poland.
The flows are approximated on the basis of family deregistration from an address in Poland.

To further infer what percentage of these pupils might have left for abroad, I refer to regional deregistration statistics. When an entire household leaves the region, they should deregister from the address at which they were residing in Poland.[2] According to the register only 187 pupils born in 1996 (age cohort surveyed) left Opolskie to live abroad between January 2002[3] and December 2011. Given the cohort size of 9 500, these flows are very small.

Thirdly, selectivity may also be driven by the decision of some migrants to return. Gibson et al. (2010) argue that this form of selectivity is only challenging if the return migrants are wrongly classified in the survey as *never migrants*. This should not pose a problem as I allow for returns from migration and ask about migration experiences pre-2009.

Moreover, I do not find much evidence of returns of children from emigration in the data. Only 106 new pupils joined the cohort in participant schools throughout the three observed years; as before, it is unlikely that all of them arrived from abroad, but I cannot specify precisely what their past experiences were. I also do not know whether children, who I observe in the data throughout the entire 3 year period, have emigrated with the family and then returned prior to joining the school. However, looking at the data on registration at a local address, I find that 28 children of this age group arrived in Opolskie from abroad between January 2002

[2]The records are very accurate for internal migration. There is a degree of uncertainty about its precision in case of international migration. The numbers captured in these statistics are likely underestimating the scale of the phenomenon (**?**).

[3]when the children were not yet of school age

and December 2011. I cannot distinguish between Polish and foreign children. Nonetheless, this is a very small group relative to the sample and cohort size.

Gibson et al. (2010) also point out that another form of selectivity is visible in the return migrant's decision regarding the duration of the stay abroad. I can control for that (at least in the observed period) thanks to the precise information on the timing of migration and duration of migratory spells.

All these elements of migration decision may be problematic, despite the use of fixed effects, only if they depend on time-varying characteristics that are also key for school performance of children.

B.4 PWA pupils dropping out of schools

One further complication I cannot control for is posed by the fact that some pupils have dropped out of the class at some point over the observed period and before the survey took place. As a result they were not included in the sample. If those who have a parent abroad were more likely to drop out, then the fact that they are omitted from the sample may introduce bias into the estimation.

If many PWA students do not progress to the next level at school and it is due to their parents' emigration, my analysis may underestimate potential negative impacts of emigration by not considering class failure in the regression and focusing on grades, conditional on having progressed to the final year of school. To consider how problematic this concern is, I would like to know the proportion of students born in 1996 (respondents' cohort) who failed at least one year (hence are not represented in the sample) and come from migrant families.

I do not possess the information; however, I observe students born in 1995 and earlier who have repeated at least one year at school. On the basis of this group, I make inferences about the potential situation among pupils born in 1996. As can be seen in Table 17, I find that there are 94 pupils in the sample (3%) who have repeated a year at school and, among those, only 17% declared having had a migrant parent in the family. Hence, PWA students do not appear to dominate the group of under-performers.

Table 17: Migration situation of pupils by birth year

	Went to school early	Started school on time	Failed at least one year				
born in	1997	1996	1995	1994	1993	no info	total
number of pupils	15	2413	81	12	1	300	2822
migration in general	3	692	39	7	0	69	809
parental migration	1	285	14	2	0	25	327
sibling migration	2	129	7	0	0	9	147
Summary for the group of older students:							
no of pupils		94					
parent abroad		16	17.02 %				
sibling abroad		7	7.45 %				
emigration in general		45	47.87 %				

Source: MECP2012

B.5 Regressions using national exam scores instead of average grades

The analysis in this paper relies mostly on the average grade as a dependent variable. The average grade, however, is awarded internally and may not objectively reflect pupils' skills. As mentioned in Section 3 of the main paper, to check whether the average grade is a satisfactory measure of school performance, I rerun the baseline regressions using the national exam results of almost 13% of respondents.

I have information about pupils' results in exams in the following subject areas: literature, history, math, science and foreign language. The average grade used in the analysis is an average over all courses taken by a pupil, which include the examined subject areas. Therefore, to make the two measures comparable in terms of the knowledge and skills they are assessing, I create a new variable, which is an average test score for an individual, based on all the exam results. It is aimed to capture a pupil's overall performance in all 5 exams.

The results are presented in Table 18. Although statistically insignificant (due to sample size), the results suggest existence of a positive relationship between parental emigration and a pupil's performance in the national test.

Table 18: Impact of parental emigration on test scores

Panel A: Average test score statistics					
	mean	st.dev.	min	max	n
average test score	53.853	16.998	20.4	96.2	334
Panel B: Regression results					
	(1)		(2)		
$emigration_{it}$	6.720**		5.052		
	(2.796)		(3.390)		
Individual controls	no		yes		
N	334		268		
R-squared	.014		.165		

Source: MECP2012
The regressions in this table are based on observations for a subsample of respondents for whom exam results data are available.
The dependent variable is the average exam result (an average of all exams pupils took). The main explanatory variable is $emigration_{it}$.
Robust standard errors in parentheses.
Statistical significance: *** 10%, ** 5%, *1%

B.6 Lagged Dependent Variable specification

In this section I explore in more detail an alternative specification to the ones presented in Section 3 in the main paper.

As mentioned, the fixed effects specifications isolate any time-invariant changes specific to a student which influence the school outcomes of a pupil and may be correlated with migration decision of the parent. One may argue, however, that some of the important omitted variables vary over time. In particular, past school performance is likely to explain a large proportion of the current performance and may be correlated with the migration decisions of parents.

A specification including a lag of the dependent variable included as an explanatory variable may shed some light on the issue of which changes in particular drive the results. By including the lagged dependent variable into the regression I am hoping to capture any remaining unobserved characteristics (not captured by individual and semester fixed effects) which may be influencing current school performance. Then the decision of parents to emigrate needs to be exogenous only to changes in the school performance and not its overall level.
I run the following regressions:

$$Y_{it} = \alpha + \beta EmigrParent_{it} + \lambda Y_{i(t-1)} + \gamma X_{ict} + \theta_t + \epsilon_{it} \tag{1}$$

$$\begin{aligned} Y_{it} = \alpha + \beta EmigrParent_{it} + \beta_1 EmigrParent_{i(t-1)} + \beta_2 EmigrParent_{i(t-2)} \\ + \beta_3 EmigrParent_{i(t-3)} + \beta_4 EmigrParent_{i(t-4)} + \lambda Y_{i(t-1)} + \gamma X_{ict} + \theta_t + \epsilon_{it} \end{aligned} \tag{2}$$

where Y_{it} is the average grade of individual i at the end of given semester t, $Y_{i(t-1)}$ is its first lag, $EmigrParent_{it}$ is a dummy variable equal to 1 if pupil i's parent was abroad at time t, and is the main variable of interest. X_{it} is a set of individual level controls, θ_t semester fixed effects. Standard errors are clustered at individual level.

In Table 19 I present the results of the regression outlined above. I also restate the results of the regressions with individual fixed effects presented in the main paper for completeness.

As can be seen in Table 19, for contemporaneous regressions, the fixed effects results indicate a positive although almost insignificant impact, whereas the outcomes in LDV regressions point towards a negative (but insignificant) relationship between having a parent abroad and the average grade. In the regressions with lags of migration dummy, both approaches produce similar outcomes, although the coefficients on variables of interest in the LDV specifications are insignificant.

It is difficult to establish which approach is best suited in this case as it depends on the belief about the behaviour of the omitted variables, i.e. whether they are time-invariant or not. The lagged dependent variable and individual fixed effects models are not nested and the distinction may play a role here. Angrist and Pischke (2009) point out, however, that LDV and FE models have a bracketing property which may be informative of the true relationship being analysed. If LDV is the correct approach but fixed effects are used, then the estimates of the positive effect will tend to be too big. If the reverse is true, then the estimates of the positive effect will be too small.

Table 19: Individual FE vs. LDV Specification

Dependent variable	Average grade									
	FE	FE	LDV	LDV	LDV	FE	FE	LDV	LDV	LDV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$EmigrParent_{it}$	.045*	.034	-.006	-.013	-.021	.057	.018	-.003	.013	-.008
	(.024)	(.024)	(.012)	(.012)	(.013)	(.042)	(.032)	(.029)	(.030)	(.029)
$EmigrParent_{i(t-1)}$						.057	.007	.064*	.009	-.002
						(.059)	(.047)	(.038)	(.037)	(.037)
$EmigrParent_{i(t-2)}$						-.121*	-.061	-.023	-.006	-.010
						(.062)	(.045)	(.045)	(.043)	(.041)
$EmigrParent_{i(t-3)}$						-.204***	-.087*	-.050	-.025	-025
						(.061)	(.044)	(.036)	(.037)	(.038)
$EmigrParent_{i(t-4)}$						-.079	-.023	.015	.001	.030
						(.050)	(.034)	(.033)	(.037)	(.039)
$Y_{i(t-1)}$			.920*	.918*	.894***			.908***	.910***	.896***
			(.004)	(.005)	(.006)			(.006)	(.007)	(.008)
Controls										
Individual	no	no	no	yes	yes	no	no	no	yes	yes
Semester FE	no	yes	no	yes	yes	no	yes	no	yes	yes
Class FE	no	no	no	no	yes	no	no	no	no	yes
N	2657	2657	2475	1851	1851	2629	2629	2435	1820	1820

Source: MECP2012
The dependent variable is the individual average grade at time t.
The main explanatory variable is the dummy variable for having a parent abroad at time t.
Other individual controls include gender, number of siblings, mother and father's age and education.
Standard errors are clustered at the class level and reported in parentheses.
FE stands for individual fixed effects, LDV stands for the lagged dependent variable specification
Statistical significance levels *** - 1%, ** - 5%, * - 10%

The FE estimates presented in Table 19 are only slightly larger than the LDV estimates and could provide an upper bound on the effect if the lagged dependent variable approach was more appropriate. In this case, the LDV estimates indicate either the correct impact or its lower bound.

Even though the results presented in the main paper may not be capturing the causal relationship between parental migration experience and the average grade perfectly, it is reasonable to conclude that there is an association of a similar magnitude to that presented in the main analysis between the two variables.

B.7 Employment potential of PWA abroad

In this section I provide further details to support the arguments made in the main paper that parental employment abroad leads to significant income gain (Section 4.1) and that it may exert a greater positive impact on children of better educated parents (Section 4.2). I argue that better educated parents may have better employment opportunities abroad and hence remit more to their families. They may also invest a higher proportion of their income in their children's education due to differences in perceived value of education.

Looking at Table 20, one may conclude that irrespective of the education level, by seeking employment abroad, Poles have a chance to increase their income three- to fourfold. Moreover, the higher their education level, the greater the gain to be made (in absolute terms).

One may argue, however, that emigrants are unlikely to be employed in their own professions, especially if they are staying abroad temporarily. For instance, Barrett and McCarthy (2007) find that immigrants from the new EU Member States earn on average 31% less than the natives in Ireland. Nonetheless, even taking into account a large wage disadvantage, there are still significant financial gains to be made and they are likely to increase in absolute terms with the educational attainment of the migrant parent.

However, the results in the main paper suggest that the gains are not only absolute, but also relative to peers of a similar background. From Table 20 it is clear that a migrant parent is likely to earn more than a parent with the same education level staying in Poland, even if he works below his qualifications and faces a wage disadvantage. The gain is smaller, however, for lower levels of education. Thus, there may be a threshold at which the income gain is sufficiently big to exert positive impact on a pupil's performance at school.

Even if the income gains are not significant enough to result in differential impacts by parental education levels, there may be other factors crucial for the size of the overall effect. For instance, parents' priorities with regards to their children may differ, depending on their education level. In particular, parents with higher educational attainment may see their children's education as very important and spend a higher proportion of income on schooling or take other steps to ensure their children perform well at school - work with them at home, etc.

Once again, it is difficult to establish whether this indeed is the case here. However, looking at Table 21, it is clear that, with exception of families where parents have tertiary education, in migrant-sending households, a lower proportion of parents staying in Poland are employed. One of the reasons for such a situation may be that parents consciously choose to remain at home to compensate for the absence of a family member and ensure well-being of their children.

Given that the income abroad may be significantly more than double what one earns in Poland, it may suffice to improve the household finances, despite one parent leaving a job.

The parents' presence at home may mitigate the negative effects of separation, or even increase the benefits of migration, if it results in a significant increase in quality time with children. This may be particularly the case when parents are better educated and invest their time with children in activities which foster better school performance (Carneiro et al., 2013).

Further, if better educated migrant parents assimilate better in the destination countries

Table 20: Mean annual earnings in construction, industry and services in 2010 by education level

overall			
	total	male	female
European Union (15 countries)	35268	39440	30459
Germany	38735	43377	32870
Netherlands	41149	45664	36358
Poland	10233	11089	9287
United Kingdom	34817	41119	28386
Pre-primary and primary education			
European Union (15 countries)	22152	24040	19206
Netherlands	28418	31426	24556
Poland	6977	7894	5750
United Kingdom	21460	23115	17775
Lower secondary education			
European Union (15 countries)	25056	27396	22094
Germany	22577	24410	20812
Netherlands	29819	32880	26150
Poland	6132	6271	5550
United Kingdom	26558	30846	22351
Upper secondary education			
European Union (15 countries)	33315	36935	28939
Germany	37308	40858	32591
the Netherlands	37209	41122	33327
Poland	8292	9008	7298
United Kingdom	29322	34274	24037
First stage of tertiary education			
European Union (15 countries)	47980	56711	39338
Germany	62873	71953	50344
the Netherlands	56356	63433	49116
Poland	14823	18466	12733
United Kingdom	42183	50295	34187
Second stage of tertiary education			
European Union (15 countries)	37395	43119	31874
the Netherlands	51985	61002	42419
Poland	13055	15319	10573
United Kingdom	37861	45959	29805

Source: Eurostat

Table 21: Proportion of parents employed by migration and education status

Panel A: If a migrant family, father emigrated				Panel B: If a migrant family, mother emigrated			
overall							
	migrant	non-migrant	difference		migrant	non-migrant	difference
mother works	0.641	0.725	0.084	mother works	0.753	0.711	-0.042
father works	0.953	0.901	-0.052	father works	0.851	0.913	0.062
elementary education							
	migrant	non-migrant	difference		migrant	non-migrant	difference
mother works	0.533	0.668	0.135	mother works	0.647	0.656	0.009
father works	0.897	0.832	-0.065	father works	0.722	0.847	0.125
vocational education							
	migrant	non-migrant	difference		migrant	non-migrant	difference
mother works	0.59	0.673	0.083	mother works	0.75	0.652	-0.098
father works	0.957	0.901	-0.056	father works	0.841	0.916	0.075
secondary education							
	migrant	non-migrant	difference		migrant	non-migrant	difference
mother works	0.701	0.764	0.063	mother works	0.827	0.749	-0.078
father works	0.959	0.925	-0.034	father works	0.884	0.934	0.05
tertiary education							
	migrant	non-migrant	difference		migrant	non-migrant	difference
mother works	0.893	0.892	-0.001	mother works	0.875	0.892	0.017
father works	0.923	0.947	0.024	father works	0.813	0.948	0.135

Source: MECP2012

and enjoy their experience, they may also transfer some of the gained cultural capital onto their children, which may be beneficial to school performance.

Therefore, on balance, gains to be made from parental emigration may increase with parental educational attainment thanks to greater income potential and different investments made in children. Moreover, children may benefit relative to their classmates whose parents have the same educational attainment, as the migrant parent is still likely to earn more and the other parent may be able to invest more time in interactions with children, e.g. by leaving employment.

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